Guideline for packaging, packaging preservation and shipment of goods

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Rev.	Changed	Date	Checked	Date	Change No.	Change No. description
Birgit Fenk		24.11.2023	Eldin Osmanovic	24.11.2023	Georgios Mantis	24.11.2023
Issued		Date	Checked	Date	Released	Date
Type/Size: 006						Do Type: PRQ
Project No:			Doc Title:	Guideline for packaging, packaging preservation and shipment of goods		
Project:			Doc No:	10004033777	Rev.: 00	Page **1** of **26**

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1.0 Scope

These Process Instructions provide guidelines for handling the shipment of goods as part of new equipment projects which are delivered by MAN Energy Solutions SE to final customers.

2.0 Purpose

They show the standard procedure adopted by MAN ES Oberhausen depending on the product in question.
Any non-conformity with our standard can be fulfilled only if the non-conforming specifications are furnished at least 6 months prior to the delivery date. Any additional costs must be subject to a separate agreement.

3.0 Content

3.1 Responsibilities

These Process Instructions come under the responsibility of the Shipping Department.

3.2 Function of wooden fit-for-purpose packaging

3.2.1 Definition of “fit-for-purpose packaging”

Terms so far used such as “seaworthy packaging” or “commercial packaging” are undefined and are replaced with the term “fit-for-purpose packaging”.
Packaging is fit for purpose if it ensures that the packaged goods arrive at the recipient undamaged, taking account of the shipping loads, shipping distance, shipping duration and the transport load profile.
In respect of wooden packaging, functions specific to shipping can be described in terms of four individual functions:

3.2.2 Protective function

The principle of the protective function is that the packaged goods are protected from the shipping loads and vice versa. The inward protection is designed to ensure that the packaged goods remain in perfect working order. To achieve this, the packaging must be able to reliably withstand the mechanical, climatic and biotic loads to which it is subjected during transport, handling and storage operations and to protect the packaged goods from such loads.
For economic reasons, the protective function should be dimensioned such that it only covers any deficiencies with respect to the resilience of the packaged goods as determined by any specific product sensitivity to the loads encountered during shipping. The knowledge of the product sensitivity is vital in this respect.

3.2.3 Storage function

Packaged goods rarely have an appropriate external shape or are sufficiently robust to allow them to be stored without the need for any additional measures. This applies to the susceptibility of packaged goods to corrosion, which is compensated for by suitable additional measures. Another important function is the suitability of the packaged goods to be stacked with different or equal packages. In this case, the packaging is to absorb pressure and to be designed such that it allows safe stacking. The capability of stacking packages safely is not only required during storage; it may also be necessary during transport in some circumstances.

3.2.4 Transport and handling function

Packaging makes packaged goods suitable for transport and handling. It must be sufficiently strong and designed such that it reduces the dynamic loads that arise during transport and handling below levels that are critical to the packaged goods.

3.2.5 Quality function

Packaging is the last manufacturing stage in the production process. Packaged goods leave the production line in a quality which guarantees that they function correctly. The task of the packaging is to ensure that these characteristics of the packaged goods are upheld until the goods reach the customer irrespective of any transport, handling and storage loads that may arise. Packaging serves to maintain the quality of the packaged goods.

3.3 Securing the packaged goods, inner packaging

3.3.1 General preparatory measures on the good to be packaged

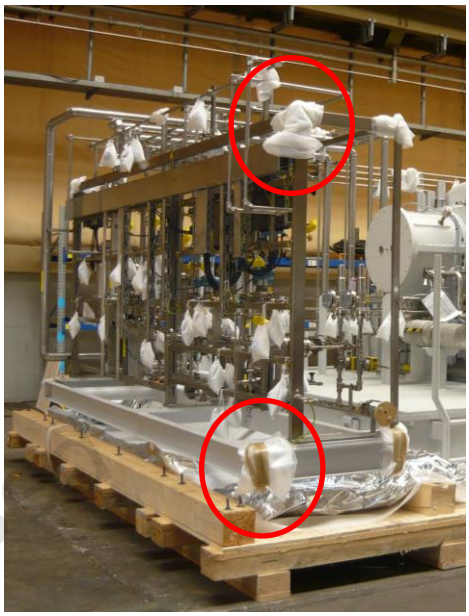
Partial dismantling of the good to be packaged, especially large-sized components, is necessary

- to facilitate handling;
- to reduce the volume to be packaged;
- to protect protruding parts or parts that are liable to corrosion;
- to prevent the packaged goods from damaging the packaging material.

For the reasons stated above, MAN ES reserve the right to dismantle parts for transport purposes. They typically include actuators and drivers of turbines and compressors as well as lines and pipes attached laterally which interfere with handling operations and would otherwise be damaged. Other parts may also be affected. If this procedure is adopted a machine skid is, however, not considered to be incompletely assembled but its components are removed for transport reasons in order to avoid damage. The removed parts are packaged fit-for-purpose separately and shipped together with the plant unit.

3.3.1.1 Padding of sensitive parts

Many packaged goods being transported are particularly sensitive to mechanical loads. They include, but are not limited to, electronic and precision-engineering products and must be protected against the effects of jolts, shocks, vibration and pressure.
Another function of the pads is to protect the surrounding film where desiccant and VCI methods are used. To prevent the film from fraying, all parts of packaged goods having sharp edges or corners which come into contact with the film cover are covered with pads.



Padding of sharp edges

3.3.1.2 Supporting parts of packaged goods

If there is a risk of parts of the packaged goods being distorted, bending or breaking under the influence of mechanical transport stresses, they are supported or dismantled.

3.3.1.3 Securing of movable parts

Movable parts must be tied down, keyed or padded in place. This also applies to disassembled parts that are not packed separately.

Tying down of parts

3.3.1.4 Pre-packaging

All our components are, wherever possible, prepackaged in associated groups, facilitating assembly including with the necessary packaging aids. All parts or items collected in groups are labelled. Spare parts and special tools/devices are collected and packaged in separate units. Subsuppliers' pre-packaging material may only be used if it is expedient from a packaging point of view, e.g. dry gas seals and tool boxes. All suppliers' features are made unidentifiable.

Pre-packaging

3.3.1.5 Additional protection against the ingress of moisture

All lids of wooden boxes are covered on the inner side with a thin-walled polypropylene sheet as an additional protection against the ingress of moisture.

3.3.1.6 Corrosion protection measures on the packaged goods and cleaning of surfaces

Careful cleaning of the packaged goods is essential for the corrosion protection methods to be successful. If dirt and dust particles and any acid and salt residues are not completely removed from the surfaces and the packaged goods are not completely dried, corrosion may occur under the protective coat in cases where the protective coating method was used.
Solvents or special cleaners are typically used for cleaning and must not have a corrosive effect. After cleaning, the item is dried completely and new contamination e.g. by finger sweat has to be prevented.

3.3.2 Corrosion protection during shipping

The manufacturer's corrosion protection measures are always taken depending on the product in question,

Final preservation for shipment in the proper sense is adjusted to the pre-preservation coat applied to avoid incompatibility.

There are three main methods for corrosion protection during shipment of packaged goods:
Protective coating method
VCI method
Desiccant method.
While preservation using nitrogen is not a standard method, it may be agreed on for parts optionally. For the applicable measures to be taken, this method must be agreed on at least 6 months prior to shipment. This method can be applied only to specific products, e.g. spare rotors in a special container.

Which method will be selected depends on the packaged good in question, the pre-preservation method used and the duration of preservation required.

Our standard provides sufficient protection for 12-months under-roof storage.

In cases where longer storage times, e.g. 24 months, are requested, an agreement must be made at least 6 months prior to delivery in every single case. This can be ensured by means of larger quantities of desiccants, moisture indicators which must be checked by the customer from the outside, and additional films applied to the outside.

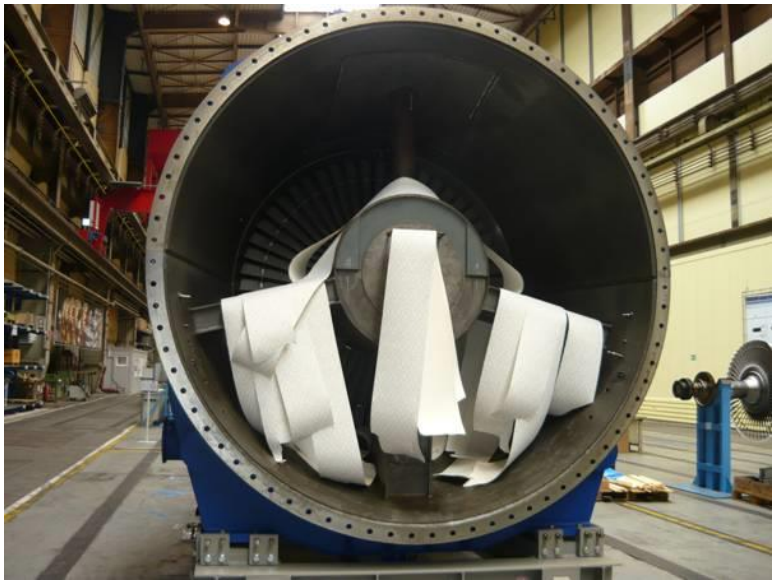
3.3.2.1 Protective coating method

The protective coating method is a corrosion protection method in which coats are applied to bare metal surfaces to protect them. For this protection method to be effective, the surface must be cleaned and dried carefully. The protective coating method is a passive corrosion protection method.
The preferred agents used are as follows:
Anti-corrosion oils and waxes such as Tectyl 502-C, Tectyl 846,
Anti-corrosion fluids Branotect by Branopac.

3.3.2.2 The VCI (volatile corrosion inhibitor) method

Unlike the protective coating and desiccant methods, the VCI method offers both active and passive corrosion protection. The chemical process of corrosion is influenced actively by vapour and contact phase inhibitors. The VCI molecules are deposited on the metal surfaces, forming a monomolecular layer, and inhibit corrosion. The active VCI substances penetrate between the ambient air and the

metal surfaces, thus preventing electrochemical reactions with water. There are two methods. The first method is one in which the active VCI agent is introduced by means of carrier applicators (film, paper etc.) and vaporized. This will produce a protective atmosphere.



Machine with VCI carriers inserted

In the second method, the active agent comes into direct contact with the packaged item via oils or sprays. Both methods can be combined. The packaged goods typically need not be depreserved. Both methods are in use.

3.3.2.3 Desiccant method

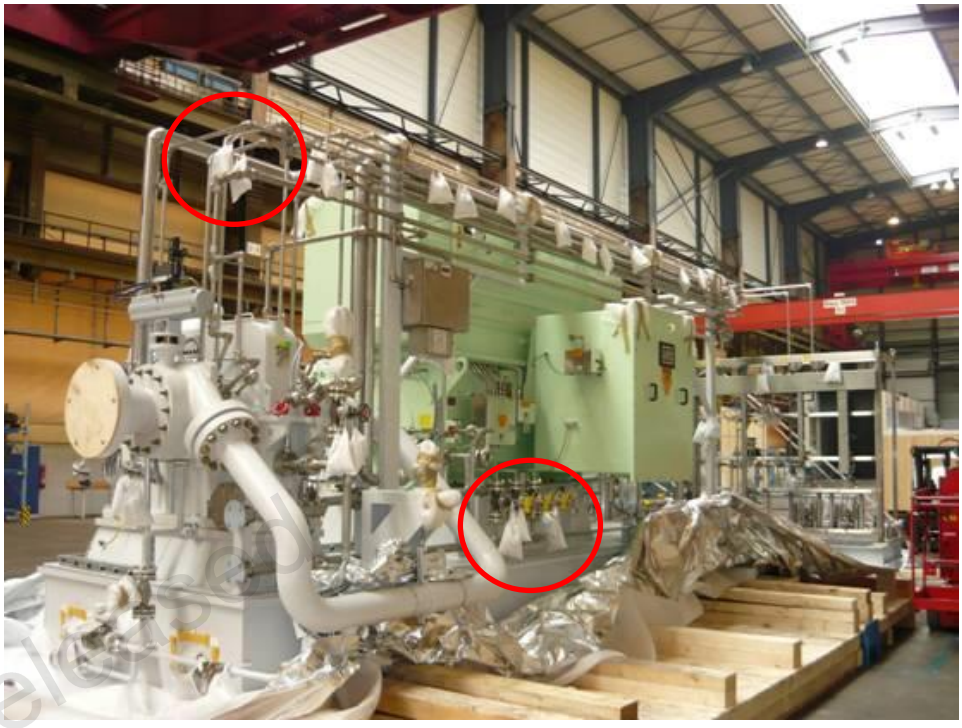
According to DIN 55 473, the purpose of using desiccants is as follows: “Desiccants are intended to protect the packaged goods from excess humidity during transport and storage in order to prevent corrosion, mould growth and the like.”

How it works:
The air in a water-tight / vapour-tight film cover is dried with desiccants to a level at which corrosive processes cannot occur on the packaged goods throughout transport and storage. The film covers can be very large and are adapted to suit the size of the packaged goods. The cover material consists of an aluminium composite film. The covers are established by heat-sealing individual film webs.

Aluminium composite film

The desiccant method is a way to protect all types of packaged goods, and in this case, a depreservation is not required. The desiccant bags contain agents which absorb water vapour and which are insoluble in water and chemically slow-reacting.
Due to the absorbency of the desiccants, humidity in the atmosphere within the film cover is reduced, thus eliminating the risk of corrosion during transport and storage as long as the film remains perfectly undamaged.

For the desiccant method to be effective it is essential that the film cover remains absolutely tight throughout transport and storage in order to maintain the microclimate within the cover.



Machine with desiccants in bags

The desiccant method loses its efficacy if the inner packaging is opened and closed incorrectly by inspectors (such as customs authorities).
Technical packaged goods, which are often very heavy, must be firmly secured to the floor of the box, which is usually achieved by bolting. Care must be taken to ensure that all punctures in the film cover are adequately sealed e.g. by means of rubber liners inserted where the bolts are installed. This also applies to chocks and wedges.

3.3.2.4 Spare rotor preserved in nitrogen in a special container (special packaging, not standard)

The container with the rotor inserted is pressurized with nitrogen at 0.2 to 0.3 bar g prior to shipment. The system must be connected to a source of nitrogen by customer immediately after arrival on the jobsite. Pressure gauges for pressure checks are attached. A nitrogen cylinder is **not** normally included in the supply as otherwise the complete container would constitute a hazardous good.

The nitrogen pressure inside the container must be checked **by customer** on arrival and at regular intervals afterwards. If the goods are to be airfreighted, the nitrogen must be discharged before.

The shipping container or machine must be fitted with the following label.

3.4 Packaging aids

3.4.1 Wooden materials

The guidelines established in the **HPE** (Bundesverband **H**olzpackmittel, **P**aletten, **E**xportverpackung, German Association for Wooden Packages, Pallets and Export Packaging) standard are applicable to all packaging that consists of wooden materials.
Only wood that meets the “Guidelines for Regulating Wood Packaging Material in International Trade” of ISPM 15 (International Standards for Phytosanitary Measures) is used.

3.4.2 Jointing means

All jointing means, described in the HPE standard, are be used. Nails are used for jointing wooden components for the construction of boxes.
Screwed boxes do not conform to the MAN ES standard and must be required separately at least 6 months before delivery.

3.4.3 Films

Aluminium composite films
The most common packaging method applied by MAN ES is to heat-seal the good to be packaged in an aluminium composite film.
VCI films; see Section 4.5 VCI carrier applicators
Truck tarpaulin

Polyethylene (PE) films
MAN ES do not usually use pure PE films for packaging purposes. In exceptional cases, if outdoor storage is required, both the packaging good is heat-sealed in aluminium composite film and the box lid is lined with a PE film to prevent the ingress of rain water.
This is a special type of packaging which must be required at least 6 months prior to delivery.
PE film is also a carrier material for the VCI application.

3.4.4 Shock-absorbing elements

The main elements used are as follows:
Air pads and bubble wraps
Foamed materials
Cardboard elements
Wooden internals

3.4.5 VCI carrier applicators

VCI film:
VCI molecules on the metal surface. Application to obtain a protective cover and atmosphere. PE film is a carrier material for the VCI application. Unlike standard PE films, VCI films are different in colour depending on the manufacturer.
VCI emitters:
For use in switch cabinets and electronic components (dust-free and sterile, with multi-metal protection)
VCI oils:
Direct contact with the metal surface. Application to bare metal surfaces. Application by painting, dipping, spraying.
VCI paper:
VCI molecules on the metal surface. Application to obtain a protective atmosphere. Paper is a VCI carrier and store.
VCI foam:
VCI molecules on the metal surface. Application to obtain a protective atmosphere. The VCI foam is of the open-cell type and acts as a VCI store.

3.5 External packaging

3.5.1 Wooden packaging

All packaging in boxes are in conformity with the guidelines of the **HPE standard**. This guideline refers to the export packaging of technical goods. They are based on the assumption that normal loads will arise along the transport chain, i.e. conditions encountered during transport by water, land and air with the goods being handled, stored and secured in an expert manner.
All design features of the assemblies, lids, walls, floors according to that standard are taken into consideration and implemented accordingly.

The HPE standard in the English language can be obtained on the Internet at the address below:

https://www.hpe.de/fachgruppe-verpackung

Boxes and crates for packaging heavy goods are typically "cut to size". As this type of packaging is tailored to suit the good to be packaged it is a specific one-off product for one particular application.

The types of wooden packaging used by MAN ES are listed below.

3.5.2 Partial cladding

Partial cladding can be used to package goods for which complete packaging in boxes or crates is not useful or required, which, however, include subcomponents that need to be protected against mechanical and/or climatic stress.

3.5.3 Load-bearing packaging

Boxes and crates are usually types of load-bearing packaging. They are designed such that they carry the entire weight of the packaged good during handling. The lifting equipment (slinging gear, ground conveyors) is attached to the package, i.e. that load-bearing packaging is subject to higher loads during handling than accompanying packaging.

Load-bearing packaging is required to

- keep packaged goods consisting of separate items together;
- stiffen unstable goods;
- allow goods to be stacked;
- stabilize packaged goods.

The requirements below are important for packaged goods having an unfavourable centre of gravity or small footprints; they should

- be suitable for handling by common shop trucks and lifting equipment;
- withstand stacking loads;
- protect the packaged goods against critical transport, handling and storage loads;
- distribute the load evenly on loading areas, thus avoiding local overloading.

Boxes and crates are considered to be load-bearing because they are nearly identical in construction. The construction of crates is the same as that of cut-timber boxes except for the arrangement of the cladding which does not form a continuous surface on crates.

3.5.4 Accompanying packaging

Accompanying packaging is frequently used by MAN ES to package heavy items.
Lifting equipment – only slinging gear / ropes, chains in this case – are attached directly to the good within the accompanying packaging, the latter not being subjected to loads. As slinging gear is attached directly to the packaged good, the packaging is not subjected to loads such as bending loads in the floor and transverse loads in the lid that would otherwise arise during handling operations.

The connection between packaging and packaged good is designed such that the own weight of the packaging is carried. As regards securing of the cargo, the packaged good is adequately secured in or on the packaging against horizontal thrust.

3.5.5 Special considerations for weights > 100 t

In cases where packaged goods have extremely large sizes resulting in high weight forces, the longitudinal skids, if correctly designed (calculated), may lead to considerable cross-sections which are difficult to implement. A floor construction from steel sections instead of wood is then sometimes used alternatively. The superstructure of the box/crate is from wood.

3.6 Load-securing aids, stowing aids

Large-sized, heavy boxes must not usually be stowed because they cannot be secured by neighbouring general cargo. They must be stowed and secured separately. As these items can be secured in a positive manner only, devices (tie-down lugs) are provided for securing and attaching load-securing gear.

3.6.1 Edge protection

To avoid that ropes/chains cut into the longitudinal skids and lid edges during crane operations, boxes having a gross mass of 3,000 kg and more are provided with sheet steel edge protections.
Edge protections provided on heavy packages are always designed to suit the lifting procedures shown on the package drawing.

The contact surface of edge-protecting angles, especially of the bottom angles on the longitudinal skid, is designed so as not to exceed the compression yield point of the wood.
The length of edge protections on lids is chosen so as to cover even the widest variety of attachment angles.

3.6.2 Load securing inside the package

To prevent the packaged good from slipping and tilting inside the box/crate, it is connected to the box floor in a non-positive or positive manner. Positive securing is achieved by connecting the box or crate bottom to the packaged item with bolts. Bolts are introduced through the longitudinal skids. Packaged goods whose footprint does not allow the use of bolts are secured by means of locating chocks which are also bolted to the longitudinal skids. In these cases pressure blocks must usually be added for (non-positive) securing in upward direction.

3.6.3 Lifting lugs, lashing points on heavy packages

Enormous forces may act on heavy machinery or component parts during transport. The necessary retention forces are reliably transferred by direct tie-downs. One important prerequisite for using direct tie-downs, however, is that tie-down points are provided on the cargo.
Heavy packages therefore have appropriate tie-down points which ensure a secured location of the cargo at any time.

3.7 Marking

3.7.1 Labelling of parts in boxes

Typical label

All parts in boxes are labelled separately for clear identification on the jobsite. The material description is always in two languages:

- Contractual language, usually English
- German

3.7.2 Marking of boxes

Marking is clear and precise, in capital letters and in black ink. The letter size is at least 40 mm and adapted on large-sized boxes accordingly.
The marking is applied on two opposite sides of the box in order to be visible from different viewing angles.

Box marked on two sides, with indication of the centre of gravity and a package drawing

Small boxes, e.g. boxes and crates containing hazardous materials, may also bear laminated DIN-A3 markings (black letters on a white sheet).

3.7.2.1 Information marking

The data below are stated on boxes:

- Recipient of consignment
- Recipient's address 1
- Recipient's address 2
- Customer's order no.
- MAN ES's job number and code word
- Package number
- Package weight in kg
- Package dimensions in cm
- Port of destination for sea cargoes

On the customer's request or if so required by the import regulations in the country of destination, the country of origin may be stated. This, however, must be known 6 months prior to delivery.

Example of box marking:
ABC COMPANY (Recipient of consignment)
3, ANY STREET (may be omitted)
NN-0000 SAMPLE CITY (NN = country code DIN ISO ALPHA 2 CODE)
PURCHASE ORDER NO. ...
MAN ES JOB H.1234567.12 Code
PACKAGE NO. ...
GROSS WEIGHT ... KG
DIMENSIONS ... X ... X ... CM
PORT OF DESTINATION (for sea cargoes)

3.7.2.2 Numbering code

SSSS-PPPNN-XXXYY

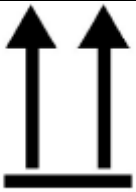
		YY: Spare parts XXX: Consecutive numbering	
	PPP: Internal project abbreviation NN: Train number		
SSSS: Place of departure			

3.7.2.3 Handling instructions

Handling instructions indicating what care is to be exercised during handling operations and storage are also applied. They indicate
whether the package is sensitive to heat or wetness;
whether it is susceptible to breaking;
the top and the bottom and the centre of gravity;
where slinging gear can be attached.

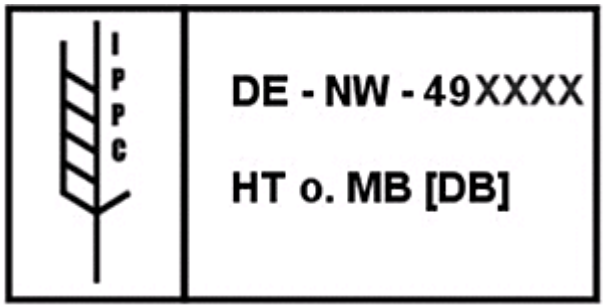
The symbols in handling instructions shown on packaged goods are defined and standardized internationally in ISO 780 and DIN 55 402. These symbols must never be omitted because they are self-explanatory and help avoid language problems in international transport operations.

Common symbols used by us are as follows:

Designation	Symbol	Explanation
Oben This way up		The package must always be transported, handled and stored such that the arrows always point upwards. Rolling, swinging, severe tipping or tumbling or other such handling must be avoided. It is not necessary, however, to stow the cargo “on top”.
Anschlagen hier Sling here		The symbol indicates merely where the cargo should be attached, not the method of attachment. If the symbols are applied equidistant from the centre or from the centre of gravity, the package will hang level if the slings are of identical length. Otherwise the slings must be shortened at one end.
Zerbrechliches Packgut Fragile, Handle with care		The symbol must be applied to goods that break easily. Goods marked in this way must be handled carefully and must never be tipped over or slung.

3.7.2.4 Special marking

All wooden packaging has, on two opposite sides, markings according to ISPM 15, as follows:



Example of marking according to ISPM 15

Description of marking:

- IPPC symbol
- Country code according to ISO 3166-1, e.g. DE for Germany;
- Regional code, e.g. NW for the Federal State of North-Rhine Westphalia, Germany;
- Registration number, unique number beginning with 49 (except Berlin);
- Treatment method, e.g. HT (heat treatment), MB (methyl bromide), usually DB (debarked).

3.7.3 Marking on tarpaulins

Tarpaulins are marked directly with ink and in marking pockets (laminated, DIN-A3 size). Marking is exactly so as described in Section 7.2 above.

3.8 Examples of application on frequently delivered goods

3.8.1 Pipes

All flanged pipes are closed with wooden covers and with bolts. VCI films are inserted between the flange and the cover. Unflanged pipe ends are closed with plastic caps.

Desiccants are not introduced into pipes.

All original oil pipes used during a test run or other acceptance tests are always closed with metal covers and adequate gaskets to avoid residual oil escaping from them.

Skid with pipes closed with wooden covers

3.8.2 Machine skids

We use different types of packaging for our machine skids. Adequate packaging is selected depending on the necessary transport route and duration and, to an ever increasing extent, on the machine size.

3.8.2.1 Tarpaulin packaging

- Tarpaulin packaging for shipment in Europe: VCI film with overlying Industrial tarpaulin(680 g/m²)

Steam turbine ready for shipment by truck

- Tarpaulin packaging for sea transports: VCI film with overlying Industrial tarpaulin (900 g/m²)

This type of packaging is preferably applied to very large machines on transport frame without built-on piping and instrumentation.

Axial compressor during the packaging (green:VCI film, gray: industrial tarpaulin)

The lashing and lifting lugs are freely accessible through openings in the tarpaulin and be opened if necessary.

3.8.2.2 Slip case

In the normal case for our skids, where the machine is completely assembled piped on a base frame, we apply a slip case as packaging for shipping overseas. This ist the type of accompanying packaging, which is fixed on the base frame. It is decided in each case whether the skid is suitable.

3.8.2.3 All-wood box

All-wood boxes will only be used in exceptional cases, since they cause the highest weight and largest dimensions. This type of packaging is a load-bearing packaging.

- Aluminium composite film with an all-wood box.

Machine in an aluminium composite film, with the box still open

Machine in a closed all-wood box

3.8.3 Electrical equipment

Electrical equipment such as control cabinets, UPS systems etc. are very sensitive to mechanical damage especially by incorrectly fastened internals. This type of damage must be avoided at any rate to maintain the proper function.

3.9 Dispatch documents

3.9.1 List of packages

A list of packages stating the dimensions, weight and type of packaging of each package is set up for each project. This list passes through several preliminary planning stages. Only a preliminary version is generated before delivery. The final version is generated at the time of delivery at the earliest.

LIST OF PACKAGES — Customer: — Destination: — MAN Diesel & Turbo SE — Order Number - Codeword

Kolli colis Runn. Nr No no No	packages bultos Anz. Quant cant	Art* kind type modo	Gewichte poids Netto kg net net neto	weights peso Brutto kg gross brut bruto	Abmessungen dimensions Volumen m³ volume volume volumen	measurements dimensions Länge cm length longueur longitud	Breite cm width largeur anchura	Höhe cm height hauteur altura	Außenfläche m² outside surface surface extérieure superficie exterior	Item No. Item No. Item No. Item No.	Inhalt contenue Deutsch german allemand aleman	contents contenido Übersetzung translation traduction traduccion
MDTO-001	1	1	47.000,00	55.300,00	184,532	951	396	490	207,325		Schraubenverdichter Einheit	Screw compressor unit
MDTO-002	1	1	1.500,00	1.900,00	5,160	428	88	137	21,671		Anhebevorrichtung	Lifting device
MDTO-003	1	1	1.450,00	1.600,00	1,773	228	108	72	9,763		3-Punktlagerung	Anti Vibration Mounts
MDTO-004	1	1	130,00	190,00	0,800	125	80	80	5,280		Kupplungswerkzeug	tools for coupling
MDTO-005	1	1	300,00	470,00	3,394	220	133	116	14,042		Zubehör	Accessories
MDTO-006	1	1	0,24	9,60	0,054	42	32	40	0,861		DGR Class 2 UN 1133	Sealing compound Hylomar M
MDTO-007	1	2	510,00	660,00	1,440	100	80	180	8,080		DGR Class 2.2 UN 1013	CO2-Cylinder
MDTO-008	1	2	13,00	40,00	0,162	54	41	73	1,830		DGR Class 2.2 UN 1013	CO2-Cylinder
DEU-001	1	1	7.365,00	8.600,00	21,586	520	137	303	54,062		Frequenzumrichter	Fan Exhaust Vent Covers, Medium Voltage Dr
DEU-002	1	1	885,00	1.450,00	8,160	272	120	250	26,128		Einheitensteuerschrank	Unit Control Panel
DEU-003	1	1	0,01	9,00	0,054	42	32	40	0,861		DGR Class 3 UN 1263	touch-up paint for UCP
DEU-004	1	1	145,00	490,00	1,240	126	92	107	6,984		Ventil	valve
											BOLD = Final	
	12		59.298,25	70.718,60	228,355				356,887			

Example of a list of packages (LoP)

3.9.2 Packing lists – Single items, Overall

The content of a package is shown on a single-item packing list. This packing list consists of two parts, one page listing the package dimensions, the second page describing the single components included.

PACKING LIST — **Customer:** RENCO SpA — **Destination:** Offshore ASHTART Oil Field, Tunisia — **MAN Diesel & Turbo SE** — H.0400020.04 SERASHFUEL

Kolli / colis / Runn. Nr / No / no / No	packages / bultos / Anz. / Quan / Quan / cant	Art / kind / type / mode	Gewichte / weights / peso / Netto kg / net / net / neto	Brutto kg / gross / brut / bruto	Abmessungen / measurements / dimensions / Volumen m³ / volume / volume / volumen	Länge cm / length / longueur / longitud	Breite cm / width / largeur / anchura	Höhe cm / height / hauteur / altura	Stück / pieces / pieces / piezas	Inhalt / contenue / Deutsch / german / allemand / aleman	contents / contenido / Übersetzung / translation / traduction / traducion
MDTO-005	1	1	300,0	470,0	3,394	220	133	116		gem. Anlage	as per attachement

Package No.	Delivery-No.	Item	PSP-Element	Material-No.	Order Part List	Qty.	Unit	Contents	Measurements	Drawing No.
MDTO-005	80089973	10	H.0400020.04.01011.51(	10560179	10560187	1	pcs	Shim	0,5 X 70 X 470	400-4-030101
MDTO-005	80089973	20	H.0400020.04.01011.51(	10560180	10560187	1	pcs	Shim	0,2 X 70 X 470	400-4-030101
MDTO-005	80089973	30	H.0400020.04.01011.51(	10560181	10560187	2	pcs	Shim	0,1 X 70 X 470	400-4-030101
MDTO-005	80089973	40	H.0400020.04.01011.51(	10560182	10560187	2	pcs	Shim	0,05 X 70 X 470	400-4-030101
MDTO-005	80089973	50	H.0400020.04.01011.51(	10560183	10560187	1	pcs	Shim	0,5 X 70 X 470	400-4-030104
MDTO-005	80089973	60	H.0400020.04.01011.51(	10560184	10560187	1	pcs	Shim	0,2 X 70 X 470	400-4-030104
MDTO-005	80089973	70	H.0400020.04.01011.51(	10560185	10560187	2	pcs	Shim	0,1 X 70 X 470	400-4-030104
MDTO-005	80089973	80	H.0400020.04.01011.51(	10560186	10560187	2	pcs	Shim	0,05 X 70 X 470	400-4-030104
MDTO-005	80089979	10	H.0400020.04.01011.51(	10616320	10616324	8	pcs	Shim	0,05 X 200 X 200	10000949690
MDTO-005	80089979	20	H.0400020.04.01011.51(	10616321	10616324	8	pcs	Shim	0,1 X 200 X 200	10000949690
MDTO-005	80089979	30	H.0400020.04.01011.51(	10616322	10616324	4	pcs	Shim	0,2 X 200 X 200	10000949690
MDTO-005	80089979	40	H.0400020.04.01011.51(	10616323	10616324	4	pcs	Shim	0,5 X 200 X 200	10000949690
MDTO-005	80089980	10	H.0400020.04.01012.51(	10545966		2	pcs	Shim s=0,05 CP100SK	0,05 X 60 X 275	400-4-052211
MDTO-005	80089980	20	H.0400020.04.01012.51(	10545967		2	pcs	Shim s=0,1 CP100SK	0,1 X 60 X 275	400-4-052211
MDTO-005	80089980	30	H.0400020.04.01012.51(	10545968		1	pcs	Shim s=0,2 CP100SK	0,2 X 60 X 275	400-4-052211
MDTO-005	80089980	40	H.0400020.04.01012.51(	10545969		1	pcs	Shim s=0,5 CP100SK	0,5 X 60 X 275	400-4-052211
MDTO-005	80089980	50	H.0400020.04.01012.51(	10545970		2	pcs	Shim s=0,05 CP100SK	0,05 X 60 X 275	400-4-052209
MDTO-005	80089980	60	H.0400020.04.01012.51(	10545971		2	pcs	Shim s=0,1 CP100SK	0,1 X 60 X 275	400-4-052209
MDTO-005	80089980	70	H.0400020.04.01012.51(	10545972		1	pcs	Shim s=0,2 CP100SK	0,2 X 60 X 275	400-4-052209
MDTO-005	80089980	80	H.0400020.04.01012.51(	10545973		1	pcs	Shim s=0,5 CP100SK	0,5 X 60 X 275	400-4-052209
MDTO-005	80089980	100	H.0400020.04.01011.51(	60932003	M	1	pcs	LOCTITE BLUE NO. 241	1 FLASCHE = 250 ML	
MDTO-005	80089982	10	H.0400020.04.01010.77(	10570587		1	pcs	Deflagration Flame Arrester,End of Line	TYPE:LERC/100/LC/100/19/60/S3/S3	
MDTO-005	80089982	20	H.0400020.04.01010.77(	10609417	10596730	2	pcs	Filter element	FUR FILTER: BFD.180.900 DN3"-08	
MDTO-005	80089982	30	H.0400020.04.01010.77(	10609434	10596730	1	set	Set of O-rings	FUR FILTER: BFD.180.900 DN3"-08	
MDTO-005	80090387	10	H.0400020.04.01012.51(	60932003	M	1	pcs	LOCTITE BLUE NO. 241	1 FLASCHE = 250 ML	
MDTO-005	80090638	10	H.0400020.04.01010.78(	10612718	10596735	2	pcs	Safety valve	ACC.DATA SHEET 10000911364 REV.1	
MDTO-005	80090865	10	H.0400020.04.01010.77(	10373943	M	1	pcs	Blind flange	2" ; CL300 ; RF	
MDTO-005	80090865	20	H.0400020.04.01010.77(	10647608	10596716	25	m	RAUCLAIR -E PCV-HOSE	DN60 (DA= 70 - DI= 60)	
MDTO-005	80090865	30	H.0400020.04.01010.77(	10647613	10596716	8	pcs	Hose clamp	AS 70- 90	
MDTO-005	80090865	40	H.0400020.04.01010.77(	99202201	M	3	pcs	Plug	SS-810-P AD1/2	
MDTO-005	80090865	50	H.0400020.04.01010.77(	99202203	M	9	pcs	Plug	SS-1210-P AD3/4	
MDTO-005	80090865	60	H.0400020.04.01010.77(	99202205	M	9	pcs	Plug	SS-1610-P AD1	
MDTO-005	80091794	10	H.0400020.04.01010.77(	10647860	10537730	4	pcs	770 FV: Adapter fürs Ölspülen		
MDTO-005	80092133/1	30	H.0400020.04.01010.08(	10666265		1	set	air inlet channel for noise hood		
MDTO-005	80092142	10	H.0400020.04.01010.85(	10596789/L001	10596791	4	pcs	Instruction Manual Flame Detectors incl. billet		
MDTO-005	80092142	20	H.0400020.04.01010.85(	10596789/L002	10596791	1	pcs	Instruction Manual Hydrocarbon Smart Transmitter		
MDTO-005	80092142	30	H.0400020.04.01010.85(	10596789/L003	10596791	4	pcs	Swagelok male connection fitting 1,2" NPT-12,7 mm		
MDTO-005	80092142	40	H.0400020.04.01010.85(	10596789/L004	10596791	2	pcs	Swagelok male connection fitting 12,7 mm		
MDTO-005	80092142	50	H.0400020.04.01010.85(	10596789/L005	10596791	1	pcs	Swagelok female connector 1,2" NPT-12,7 mm		
MDTO-005	80092142	60	H.0400020.04.01010.85(	10596789/L006	10596791	1	pcs	Swagelok screwed-on adapter 1,2" NPT-12,7 mm		
MDTO-005	80092142	70	H.0400020.04.01010.85(	10596789/L007	10596791	1	pcs	Swagelok threaded adapter 1,2" NPT-12,7 mm		
MDTO-005	80092142	80	H.0400020.04.01010.85(	10596789/L008	10596791	6	pcs	Cable gland HAWKE 501/453 RAC 1,2" NPT		
MDTO-005	80092142	90	H.0400020.04.01010.85(	10596789/L009	10596791	30	m	Instrument cable 1*2*1,5 mm²		
MDTO-005	80092142	100	H.0400020.04.01010.85(	10596789/L010	10596791	30	m	Instrument cable 1*3*1,5 mm²		
	1		300,0	470,0	3,394					

Example of a single-item packing list

One copy showing the content of the box is put into the box, the second copy is inserted into a transparent pocket protected by a metal sheet and attached to the outside of the box.

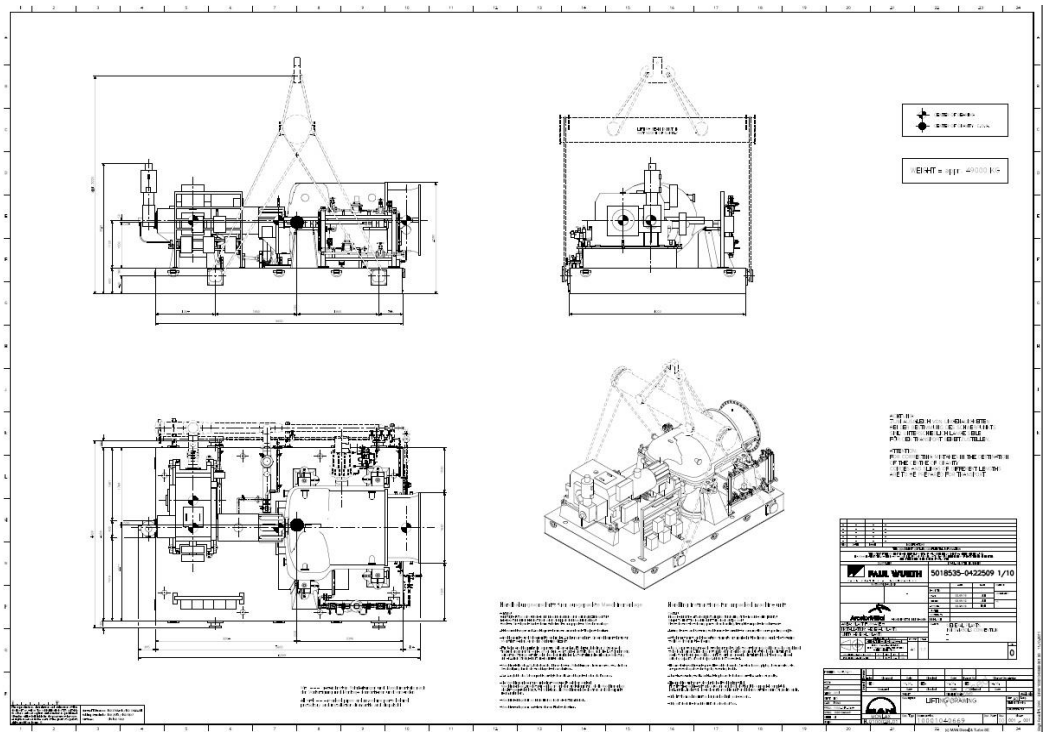
Packing list attached to the outside of the box

An overall packing list in the MS Excel format showing the content of all boxes can be obtained from the Project Management.

3.9.3 Transport/lifting drawing

A lifting drawing, stating the information below, is set up for all machine skids:

- Main dimensions and calculated net weights;
- Calculated centres of gravity;
- Lashing points;
- Parts that are removed for reasons of transport to be shown;
- Handling instructions in certain circumstances.

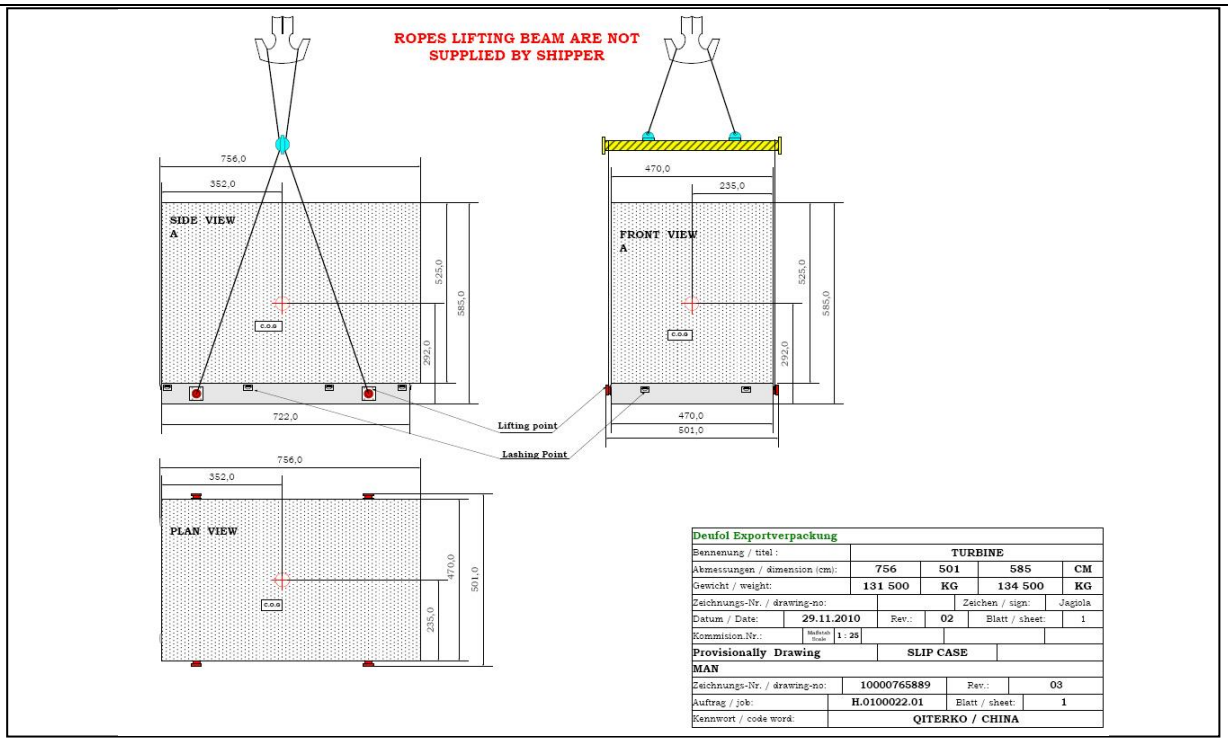


Example of a lifting drawing

3.9.4 Package drawing

A package drawing shows the information below:

- Final package dimensions;
- Type of packaging;
- Gross weights;
- Code word



Example of a package drawing

One copy of the package drawing is attached to the outside of the box inside a water-tight envelope.

3.10 Miscellaneous

3.10.1 Container

MAN ES do not use standard containers. Containers do not constitute an independent, and especially not a sea-water-proof, packaging means but are handling aids. Every part needs some fit-for-purpose packaging. Many components supplied by us, especially machine skids, prefabricated pipes and bought-in plant components, are too big and too heavy to be transported inside a container

3.10.2 Sea freight

MAN ES have all sea freight packages transported below deck on ships that are not older than 15 years.

3.10.3 Hazardous material

MAN ES uses only a few hazardous materials. They typically include paints, hardeners or sealants that are required for assembling machinery or for touch-up work. All hazardous materials are packaged separately and marked clearly. A specific procedure has been established at MAN ES which is adhered to during the order handling process. All hazardous-materials guidelines applicable to each particular transport route are adhered to.

Example of hazardous-materials marking for sea freight transport

3.10.4 Local storage on jobsites

MAN ES's preservation measures protect component parts against corrosion for 12 months. All component parts must therefore be stored in heated and closed bays or rooms after arrival on site. The humidity of the microclimate must be checked at regular intervals.

Outdoor storage of parts is not permitted. MAN ES will not assume liability for damage caused by improper storage.

When the consignment arrives on the jobsite, it must be checked for completeness and damage. This must be performed using the supplied lists of packages and shipping notes. Missing parts must be queried immediately and marked on the shipping documents.

The containers of packaged components may not be opened until just before use of the component parts in order to maintain the preservation of the parts.

In the event of a packaging being damaged, a photographic documentation must be prepared and MAN ES must be informed officially and in writing of the condition being recorded.

3.10.5 Transport supervision systems

MAN ES do **not** install transport supervision systems to accompany transport, handling and storage.

If the use of humidity, tilt, jolt and shock indicators without or with electronic recorders is requested, this will constitute a special type of packaging which will have to be required at least 6 months prior to delivery and be subject to an extra charge.

3.11 Sources

MAN ES's present guideline is based on the „GDV Verpackungshandbuch zum Bau von Kisten und Verschlägen" issued by the Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV) by courtesy of that organization. To open this source please follow the link below:

http://www.tis-gdv.de/tis_e/verpack/verpackungshandbuch/verpackungshandbuch.htm

The guidelines established in the **HPE** (Bundesverband **H**olzpackmittel, **P**aletten, **E**xportverpackung, German Association for Wooden Packages, Pallets and Export Packaging) standard are applicable to all packaging that consists of wooden materials.

For details please visit:

http://www.hpe.de

4.0 Attachments

Not applicable

5.0 Replacing

VA-15-104/A-C and VA-15-105/A-C (interim solution 10003840082)

End of document