

Packing and packaging of goods for FLSmidth

Execution of packaging
Stowing of containers

Approved date: 15th SEP. 2008

Created by: HenA

Approved by: AaH

List of contents:

	Page:
1 General notes.....	4
1.1 Introductory notes.....	4
1.2 Familiarity with this manual	4
1.3 Standards.....	4
1.4 How to use this manual	5
1.5 The responsibility of the supplier	5
1.6 Ownership	5
1.7 Factors requiring special attention	6
1.8 Transport definitions	6
1.8.1 Mode of transport	6
1.9 Packing of goods	6
1.9.1 General notes.....	6
1.9.2 Packing of packages, including joint packaging	7
1.9.3 Impacts sustained by the goods while in transit.....	8
1.9.4 Positioning and fixation of equipment	8
1.9.5 Lifting and securing of goods while in transit	9
1.9.6 Use of stiffeners	9
1.9.7 Dangerous goods.....	10
1.9.8 Designations	10
1.10 Marking procedures	11
1.10.1 Marking of equipment - label.....	11
1.10.2 Marking of packages	11
1.10.3 Marking of dangerous goods.....	11
1.11 Packing for local transport	11
1.12 Packing for air transport	12
2 Examples.....	12
2.1 Flow diagram for packing	12
2.2 Dimensioning and execution of packaging.....	14
2.2.1 Closed box.....	14
2.2.2 Crate.....	17
2.2.3 Light box	20
2.2.4 Full steel frame	20
2.2.5 Half steel frame	22
2.2.6 Transport frame for bundle	24
2.2.7 Cable drum	26
2.2.8 Unpacked	28
2.2.9 Unpacked- container.....	30
2.2.10 Barrels on pallets.....	32
2.3 Lining, packing and protection.....	33
2.3.1 Lining of closed box and light box	33
2.3.2 Dense packing.....	33
2.3.3 Valved packing	34
2.3.4 Protection	35
2.3.5 Materials for packaging and fillers	35
2.4 Electrical equipment.....	36
2.4.1 General notes.....	36
2.4.2 Packaging instructions for export packing A	37
2.4.3 Means of transport and dismantling of equipment	37
2.4.4 Packaging of electrical equipment and lining of boxes.....	38

2.4.5	Placing the equipment in boxes	39
2.4.6	Packaging instructions for export packing B.....	40
3	Stowing of container.....	41
3.1	Container transport, generalized.....	41
3.2	Container types	41
3.3	Stowing	42
3.4	Marking	42
3.4.1	Positioning of units.....	42
4	Data sheets	44
4.1	"Open Box" Inspection.....	44
4.1.1	Procedures for Pre-Shipment Inspections	44
4.2	Aluminium foil	45
4.3	Desiccants	46
4.4	Survey of symbols for handling and storage	47

Reference is made to the following instruction manuals:

Shipment of goods	70001730
General workshop instructions	520530
Shipment of goods	19691-11

NOTE!

The present instruction manual is concerned with the situations which, according to the experience of F. L. Smidth, are the most likely to occur. An exhaustive enumeration of all conceivable situations, which may occur during packing, marking and shipment of the equipment, cannot be provided.

Consequently, if a situation should arise, the occurrence of which **is not** foreseen in the instruction manual, and which the operator is/or feels unable to handle, it is recommended that F. L. Smidth is contacted without undue delay for advice on appropriate action.

1 General notes

1.1 Introductory notes

It is the intention of FLSmidth, with this revised edition of the packaging instructions, to focus specifically on the following issues, in order to ensure:

- uniform global packaging of FLSmidth goods
- minimization of damage to goods in transit
- economical usage of packaging materials
- increased use of containerized transport

To achieve these goals, the supplier must pack FLSmidth goods in strict accordance with the proposed and defined MINIMUM requirements outlined in this manual by FLSmidth.

If the supplier finds it preferable to use their own packaging system, this must be approved by the purchasing department of FLSmidth, and the approval will be made in consultation with the INSPECTION and LOGISTICS units.

Deviations from this instruction manual may occur if specifically otherwise provided in:

- the purchase order
- packing instructions
- the workshop instruction manual
- drawing outlining packaging procedure

1.2 Familiarity with this instruction manual

In its entirety, this instruction manual is an integral part of the purchase order, and the supplier must ensure that all persons involved in the packaging of goods have read and understand this manual before packaging of goods is started.

If packaging is done by a sub-supplier, it will also be the responsibility of the supplier to ensure compliance with the directions outlined in this manual.

1.3 Standards

Reference by FLSmidth to any International and National Standard does not incur an obligation on FLSmidth to provide any recipient, reader or user of the documentation with samples or copies of the said Standard(s).

Hence, any recipient, reader or user of the documentation is expected – at his own cost – to obtain necessary knowledge of the contents of any of the International Standards referred to herein.

FLSmidth does not undertake any responsibility or liability for injury, damage or losses inflicted upon any recipient, reader or user of FLSmidth documentation or a third party by the failure by any receiver, reader or user of FLSmidth documentation to obtain any necessary knowledge of the contents of any of the International and National Standards referred to herein, nor does FLSmidth waive any right to hold a receiver, reader or user of FLSmidth documentation responsible for any injury, damage or loss inflicted upon FLSmidth as a consequence thereof.

The edition of the standards indicated in any documentation is that valid at the time of publication of the documentation.

1.4 How to use this instruction manual

This instruction manual is organized as follows:

Section 1 – The main part.

The main part outlines the overall guidelines and the responsibilities relating to packing and packaging.

Section 2 - Examples.

The section containing examples is configured as a guide for selection and execution of packaging, and giving instructions for packing and protection of the goods. The examples are based on the **Form 2.1 Flow diagram for packaging.**

This flow diagram provides an overview of the types of packaging which can be used to pack machine equipment and electrical equipment for, respectively, the general cargo transport and container transport, containing also references to the execution of the individual types, and the possible use of lining and protective padding.

Section 3 – Stowing of container.

This section provides a detailed description of methods used for stowing containers.

Section 4 – Data sheets.

This section contains various data sheets and surveys.

1.5 Responsibility of the supplier

The responsibility for ensuring that packing is done correctly in accordance with the directions outlined in this manual **rests solely with the supplier.**

If in the opinion of the supplier, the packaging suggested and defined by FLSmidth is deemed to be unable to withstand the anticipated impacts and will not provide sufficient protection of the equipment in transit to the final destination, the supplier must get in touch with FLSmidth for correction of packaging to extent required.

For all supplies involving subsequent transportation, the equipment must be packed/preserved in manner ensuring that, during a period of minimum 12 months or a period specifically defined in the purchase order, the equipment will maintain properties, visually and functionally, corresponding exactly to those existing before packing of the parts was done by the supplier.

1.6 Ownership

Unless specifically otherwise defined in the purchase order, the packaging used is the property of FLSmidth, being fully included in the agreed price.

1.7 Factors requiring special attention:

It is very important that the attention of the FLSmidth supplier is directed to the following points in connection with the packing of goods for shipment:

- If the purchase order calls for a "pre-shipment" inspection to be made, it must be possible for FLSmidth and/or an inspection company appointed by our customer or by FLSmidth to make an 'Open Box' inspection prior to final closing of packaging – cf. section 14.
- Contact the FLSmidth inspector or the responsible person in the purchasing department if there is any doubt as to packaging procedures.
- FLSmidth is fully entitled to reject at any time incorrect packaging, and to demand repackaging of parts for the account of the supplier.

1.8 Transport definitions

1.8.1 Mode of transport

Two modes of transport and two equipment categories are used by FLSmidth and will be specified in the order.

In case of absent information, it is the responsibility of the supplier to obtain the relevant data.

The modes of transport being used are:

- General cargo transport
- Container transport

Goods which can be stowed in container(s) must be packed with a view to containerization unless otherwise agreed with FLSmidth PURCHASING or LOGISTICS.

Equipment categories being used are:

- Machine equipment
- Electrical equipment (electrical and electronics equipment)

Regardless of transport mode, the packaging used must be capable of ensuring that, throughout the process, the goods will maintain the characteristics they had at the time of packing.

Transport can be done in one or several combinations, using one or several of the following means of transportation:

- Truck– closed or open
- Railway car – closed or open
- Ship – in container below/on deck, or as general cargo below deck unless otherwise specified.
- Aircraft

1.9 Packing of goods

1.9.1 General notes

For parts packed for general cargo transport are concerned, only the packaging will protect the parts from damage, therefore, requiring seaworthy packaging.

Seaworthy packaging must be capable of withstanding impacts sustained in connection with the transportation of general cargo by ship.

As for parts to be packed for container transport, the container will protect them from damage, and, therefore, packaging can be executed so that they are able to withstand these less severe impacts. The goods will be kept in a container throughout, or for the main part of, the transport process.

For all modes of transport, it is essential to ensure that the equipment is packed in manner allowing it to be stacked on the transport vehicle or in a container subject to a load of minimum 1 t/m².

Also the selected packaging must be able to withstand several reloading operations involving use of crane and forklift truck.

1.9.2 Packing of packages involving also collectively packed goods.

The definition "package" is the designation assigned to a unit. The unit may comprise one item or may comprise several items packed together. When items are packed together, this must always be in relation to the same equipment number as indicated in order.

Packaging requirements for package:

- package for general cargo transport must as a minimum be ½ m³
- package for container transport must as a minimum be ¼ m³
- split-up equipment should be packed together where possible

(Example: A machine where electric motor, a projecting part or support is dismantled).

Collective packing of parts:

Definition:

When parts belonging to two or more orders are included in the same package, this is referred to as collective packing of parts.

Rules:

In this context, special attention must be given to two factors:

- 1) Always use the lowest FLSmidth Purchase Order "PO" number for marking of package.
The other PO numbers must not be used for marking of package.
(However, all PO numbers must be indicated in the relevant packing list).
- 2) Orders from different departments must not be packed together.
The first three digits in equipment number or item number represent the department number.

Example 1:

Equipment No. **321**.RM100 must not be packed together with Equipment No. **431**.KL100.

Example 2:

Consequently, item No. **321**.100 must not be packed together with Item No. **431**.100.

The orders may be packed together if the indicated department number is the same.

Example 3:

Equipment No. **321**.RM100 may be packed together with Equipment No. **321**.FN400.

Example 4:

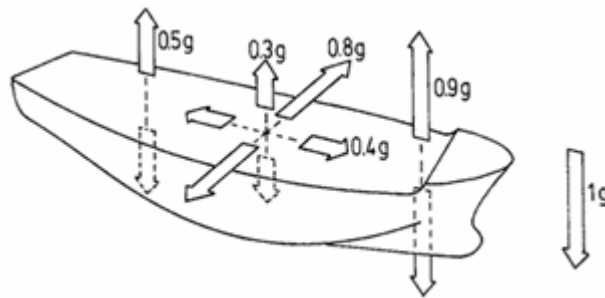
Item No. **431.100** can be packed with Item No. **431.500**.

1.9.3 Impacts sustained by the goods while in transit

The packaging used and the goods contained therein must be capable of withstanding the natural impacts resulting from movements occurring while in transit, from the point of manufacture to the final project destination; the impact forces involved will be quite substantial in connection with maritime transport. The packaging must be capable of withstanding such impacts whether shipped as general cargo or in containers.

In case of maritime transport, the packaging and goods contained therein will be subjected to the G-forces indicated below:

The movements of a ship:



1.9.4 Positioning and fixation of equipment

Damage in transit mainly occurs as a result of inadequate or incorrect fixation of the equipment inside the packaging.

It is a fact that in connection with maritime transport the equipment may be subjected to substantial listing movements of up to 30 degrees, and, therefore, it is essential to ensure effective and secure fixation of the parts inside the packaging. The goods must never under any circumstances be able to move inside the packaging while in transit, since this might cause it to break loose and cause extensive damage to the outer packaging.

Consequently, it is very important to consider all relevant aspects prior to packaging in relation to the correct positioning of the equipment and the means available for fixing and securing the individual parts.

Optimization of packaging is achieved by:

- ensuring that the point of gravity is kept as low as possible
- ensuring even load distribution at the bottom of packaging
- ensuring correlated dimensions of equipment and packaging
- ensuring vertical packing of plate parts – if possible
- ensuring fixation of equipment to the bottom of packaging
- ensuring that fixation points for equipment are stiffened and reinforced
- ensuring that equipment is fixed in the strongest areas of packaging (beams, corners, double boards)
- ensuring that equipment is secured by means of fixed connections (use of bolts, welding, stop blocks)

When packing, distance blocks/plates/bearers must be secured to the packaging; this is necessary to avoid displacement of the parts while in transit, which may cause the equipment to break loose.

Machined surfaces must not be in direct contact with wood. Apply the rust-proofing agent directly to the wood at the point of contact or place tarred paper between the wood and the surface.

Protect exposed surfaces (e.g. painted surfaces or clear plastic covers) to avoid wear marks caused by the boards and bearers of the box. For example, place adhesive tape on the contact faces of the equipment, see also section 4.

1.9.5 Lifting and securing of goods during transport.

Lifting of goods

It must be possible to lift and place the goods on the transport vehicle without causing damage to the packaging. This is done by using the designated lifting devices (hooks, lifting eyes etc.) or by making it possible to place lifting tools such as slings and similar means. **If the supplier fits hooks, lifting eyes etc. not specified by FLS on the manufacturing drawings, this is the sole responsibility of the supplier.** It is essential to apply the correct symbols and directions in accordance with DIN 55402, see sub-section 4.4, in order to ensure that the goods can be lifted safely and without any risk of damage to the packaging.

Securing of goods

It must be possible to secure packages on the transport vehicle to ensure fixation of packages during transport. Securing of the goods on the transport vehicle will be undertaken by the carrier, who will also be responsible for ensuring that the goods are effectively secured to avoid damage in transit.

However, the specific points where the carrier may secure the goods to ensure proper fixation in transit must be indicated, identifying also the points which must not be used for securing goods to prevent damage to goods or packaging in transit, see sub-section 4.4.

1.9.6 Use of stiffeners

Stiffeners are used for several reasons, and, therefore, they are very important in connection with the packing of equipment.

Fitting of stiffeners will reinforce the packaging, enhancing the possibilities of securing the equipment. Also, the stiffeners may act as backstops which will prevent the equipment from being displaced in transit, or they may be fitted to support heavy protruding parts.

So, when stiffeners are used, it is essential to ensure that they have the capability to withstand the stress loads exerted by the equipment and that they are effectively fastened by means of bolts or screws to prevent them from breaking loose while in transit.

The goods must not under in any circumstances be used to strengthen the box, but must always be clear of the sides of box and the box cover.

If steel sections are used for stiffening purposes, they must be painted according to the paint programme No. 1a (see instruction No. 520530) or according to the procedures applied for the packed goods.

1.9.7 Dangerous goods

Dangerous goods must be packed and shipped in accordance with:

- ADR 2007** - **International Transport of dangerous goods by road**
- RID** - **Carriage of dangerous goods by rail**
- IMDG** - **International Maritime Dangerous Goods**
- ICAO-TI – ICAO** - **Technical Instructions for the safe transport of dangerous goods by Air**

Examples of dangerous goods:

- Radioactive substances (e.g. in indicating units)
- Inflammable, corrosive or toxic substances such as:
Glue, oil products, acid, bases and paint
- Pressurized gas cylinders

The following information **must** be provided in the packing list.

- Proper Shipping name
- UN. NO.
- Class
- Packing group
- Flashpoint
- Marine Pollutant (answer simply: yes or no)
- The most dangerous ingredient of the substance

In connection with shipment of dangerous goods, the Material Safety Data Sheet (MSDS) must always be forwarded together with the packing lists. Also the dangerous goods section must be ticked off in the packing list

Contact FLSmidth LOGISTICS in case of any doubt concerning the completion of the packing lists.

Important! Dangerous goods must not be packed together with any other equipment – and it must be clearly marked as stipulated above.

1.9.8 Designations

The following designations for packing are used by FLSmidth:

- closed box, case
- crate,
- light box, case
- half steel frame, frame
- full steel frame, frame
- barrel on pallet, drum
- cable drum, drum
- bundle
- unpacked or skid

For packing as per designations above, the designation must be used in the packing list and the invoice sent to FLSmidth.

1.10 Marking

1.10.1 Marking of the equipment – label

Follow the directions given in instruction Nos. 19691 and 70001730 (shipment of goods) according to which all equipment must be labelled for identification purposes.

1.10.2 Marking of packages

Follow the directions given in instruction Nos. 19691 and 70001730 (shipment of goods).

Mark the packing with symbols, such as safety markings, sling chain, gravitation mark etc. as per DIN 55402, see sub-section 4.4.

Packages weighing more than 1500 kg must be marked "chains"/"slinging marks" indicating the lifting points.

Packages weighing less than 1500 kg must be marked "chains"/"slinging marks" if deemed necessary, for example in case of displaced point of gravity.

Also "gravitation marks" must be painted to indicate the point of gravity and "forklift truck" where deemed to be necessary (No weight limit).

Lined goods or densely packed goods must be marked for example with the ISO-symbol "Keep dry" (umbrella).

All packaging to be marked with "This side up" (arrows).



1.10.3 Marking dangerous goods

Dangerous goods must always be marked in accordance with international regulations, see sub-section 1.9.7.

1.11 Packing for local transport

Local transport is taken to mean **road transport over a short distance** which does not involve reloading of goods, i.e. loading of goods at the supplier's premises and delivery to plant site or the packaging contractor.

Unless otherwise agreed, it is the responsibility of the supplier to determine what constitutes responsible packaging, giving due consideration to:

- Protection of the goods (including sensitive components, painted surfaces)
- Risk of damage in transit (level of fixation, damage resulting e.g. from a collision)

1.12 Packing for air transport

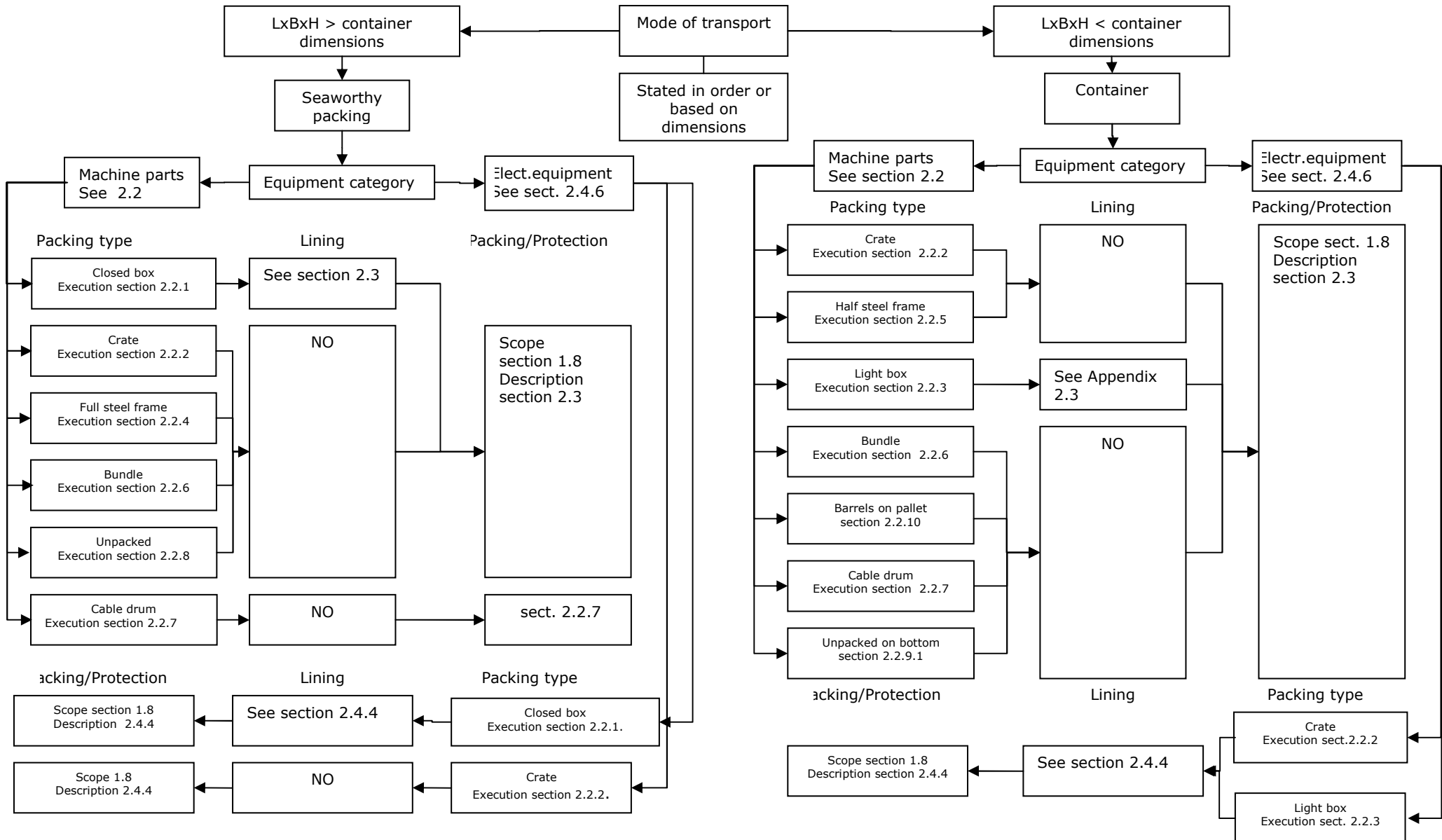
The procedures for packing goods for air transport are as follows:

1. When air freight is the preferred mode of transportation, the lightest and smallest type of packaging must be selected, so that due account is taken of the weight and volume of goods involved. At the same time it must be ensured that the goods are adequately packed to withstand air transport. Reference is also made to packing in light box, sub-section 2.2.3.
2. All sharp edges and corners must be covered/protected to prevent them from causing damage to other goods in aircraft or aircraft equipment. Unpacked goods or bundles may also be accepted for air freight provided that all sharp edges, including ends of e.g. tubes and/or beams, are also covered and if the goods are securely fastened to ensure immobility.
3. If goods are delivered on pallets, bottom or in a frame, it must be securely fastened to prevent it from moving or being displaced when subjected to turbulence during take-off and touch-down. The aircraft may also be subject to turbulence during the flight, and, in this context, it is essential to ensure that the goods are thoroughly secured/fixed in the box or on the bottom/pallet to ensure immobility. It must be possible to lift the goods using a forklift truck and the goods must be stackable.
4. If goods arrive at an airport terminal without meeting the aforementioned criteria, the goods will be rejected and the necessary rectifications will be carried out by airport personnel **for the account of the supplier.**

2 Examples

2.1 Flow diagram for packing See next page

2.1 Flow Sheet for Packing



2.2 Dimensioning and execution of packaging

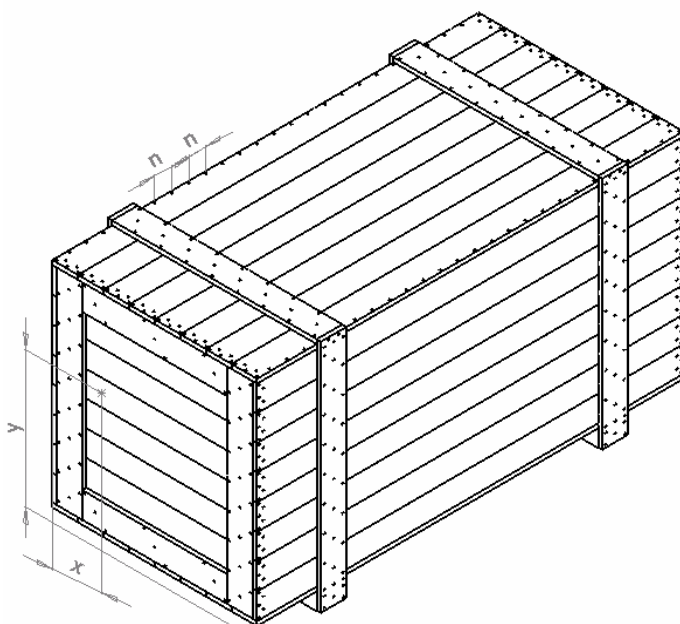
2.2.1 Closed box

There are 3 types of boxes. Type selection depends on the weight of the goods. The 3 types are identically configured, except for the design of the bottom and the material thickness, i.e. details indicated in one of the illustrations will apply to all three types of boxes.

Before the case is made, it is important to give consideration to the characteristic features of the equipment. For this purpose, a method is indicated below outlining the most important points in connection with the execution of the box.

Method:

1. Determine the weight, length, width and height of the equipment (weight indication is required in the packing list)
2. Determine whether the equipment is subjected to point loads or evenly distributed loads at the bottom of packaging.
3. Place the support for packaging at appropriate locations, and if necessary provide reinforcement of stress-loaded zones.
4. Determine whether the equipment is top-heavy (may be indicated by marking of the equipment or if the ratio between the height to point and gravity and width is more than 2:1. Tilting indicators must be fitted)
5. Use the table (see 2.2.1.1) to select the correct material dimensions.
6. Make the box as per directions (see 2.2.1.1), based on the assessments as per items 1-5.
7. Protect exposed parts/surfaces/sharp edges (if necessary, dismantle projecting parts)
8. Equip the box with a lining, and, if necessary, wrap up the equipment.
9. Place the equipment in the box and secure it at the strongest points at the bottom of packaging.



The illustration shows:

A closed box for goods up to 2000 kilos. Dimensions and execution (see 2.2.1.1).

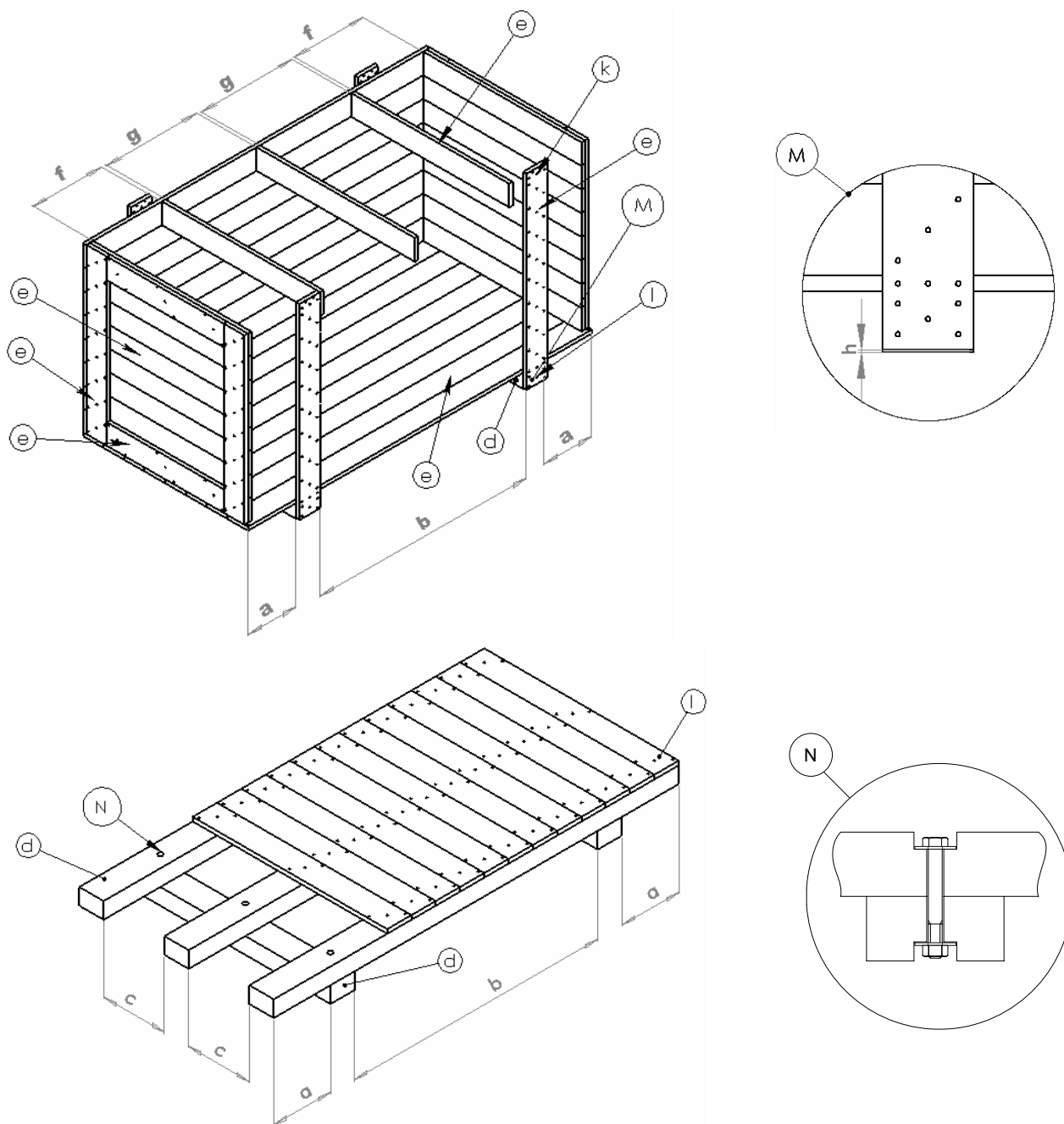
Position of point of gravity (TP) varies considerably according to equipment. After the final position has been determined and indicated, the distances x and y must be identified.

x is the smallest distance from the side of the packaging to TP.

y is the distance from the underside of the bearers to TP.

For electrical equipment, one shock indicator and 2 tilt indicators must be fitted if ratio: $y/x > 2$.

Illustrations and dimensions



Bottom 2000-5000 kilos
Bottom 5000- kilos
2.2.1.1.

Dimensions closed box									Nail length		
Weight [kg]	a max [mm]	b max [mm]	c max [mm]	d [mm]	e [mm]	f max [mm]	g max [mm]	h [mm]	k [mm]	l [mm]	n [mm]
0 - 2000	500	1000		100 x 150	25 x 150	400	800	5	50	75	100
2001 - 5000	500	1000	600	100 x 150	25 x 150	400	800	5	50	75	100
>5000	500	1000	600	100 x 150	32 x 150	400	800	5	75	90	100

The horizontal side plates and end plates can be made with a width of 100 mm.

Photos

Photo shows: A closed box 0-2000 kilos. Side view



Photo shows: End of a closed box



Photo shows: End of the box with additional stiffening elements

2.2.2 Crate

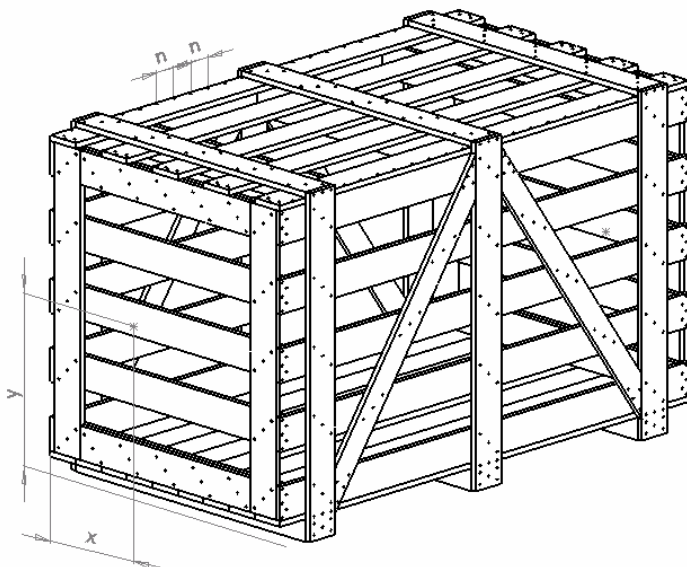
Crates can be used for Break Bulk- and container transport. The only difference for crate used for containers is that the distance between the slots is greater.

There are 3 types of crates. Type selection depends on the weight of the goods. The 3 types are identically configured, except for the design of the bottom and the material thickness. This means that details indicated in one of the illustrations will apply to all three types of crates

Before the crate is made, it is important to give consideration to the characteristic features of the equipment. For this purpose, a method is indicated below outlining the most important points in connection with the execution of the crate

Method:

1. Determine the weight, length, width and height of the equipment (weight indication is required in the packing list)
2. Determine whether the equipment is subjected to point loads or evenly distributed loads at the bottom of packaging.
3. Place the support for packaging at appropriate locations, and if necessary provide reinforcement of stress-loaded zones.
4. Determine whether the equipment is top-heavy (may be indicated by marking of the equipment or if the ratio between the height to point and gravity and width is more than 2:1. Tilting indicators must be fitted)
5. Use the table (see 2.2.1.1) to select the correct material dimensions.
6. Make the crate as per directions (see 2.2.1.1), based on the assessments as per items 1-5.
7. Protect exposed parts/surfaces/sharp edges (if necessary, dismantle projecting parts)
8. Equip the crate with a lining, and, if necessary, wrap up the equipment.
9. Place the equipment in the crate and secure it at the strongest points at the bottom of packaging.



The illustration shows:

A crate for goods up 2000 kilos.
Dimensions and execution (see 2.2.2.1)

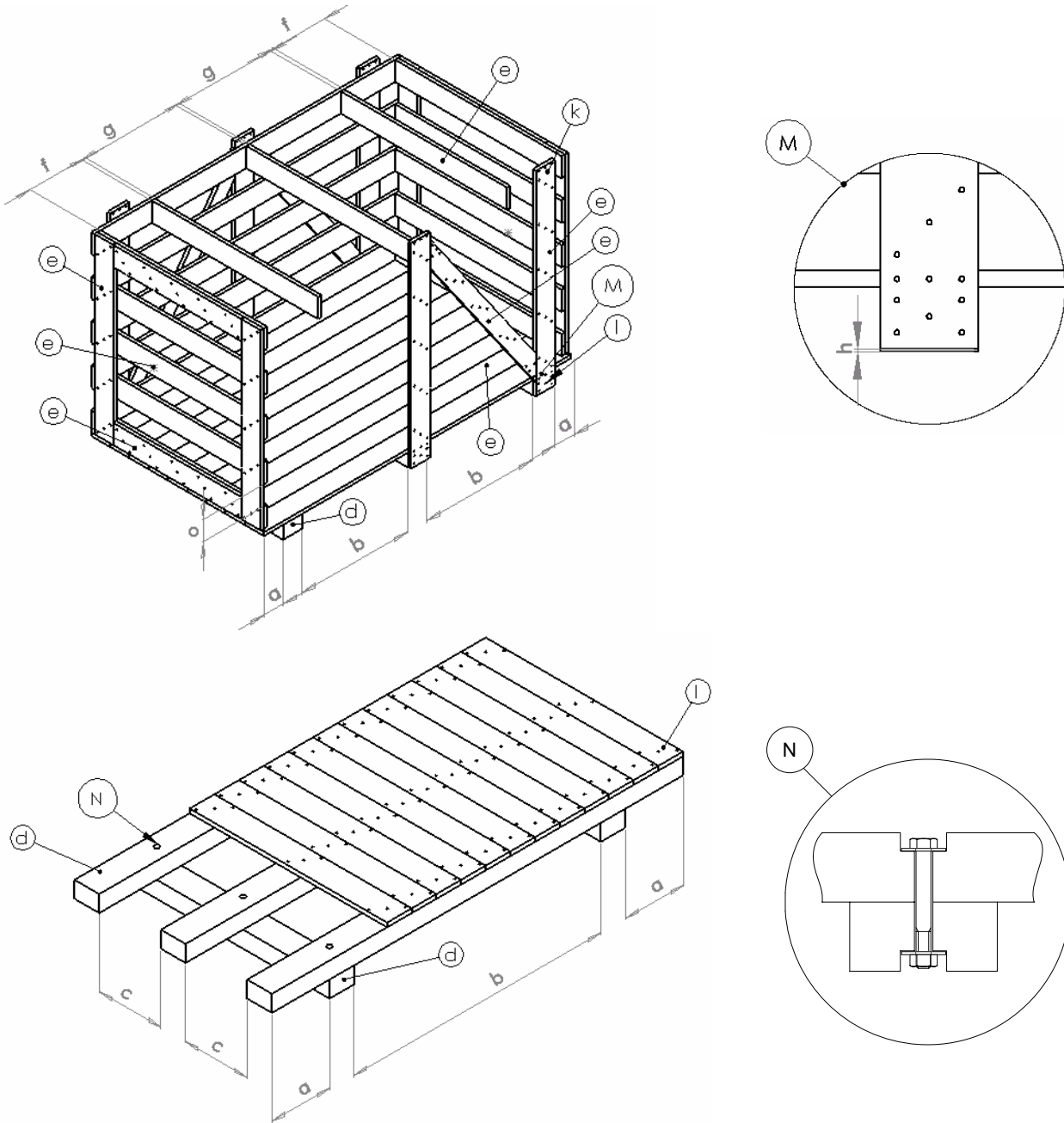
Position of point of gravity (TP) varies considerably according to equipment. After the position has been determined and indicated, the distances x and y must be identified.

x is the smallest distance from the side of the packaging to TP.

y is the distance from the underside of the bearers to TP.

For electrical equipment, one shock indicator and 2 tilt indicators must be fitted if ratio: $y / x > 2$.

Illustrations and dimensions



Bottom 2000-5000 kilos

Bottom 5000- kilos

2.2.2.1

Dimensions crate									Nail length		
Weight [kg]	a max [mm]	b max [mm]	c max [mm]	d [mm]	e [mm]	F max [mm]	g max [mm]	h [mm]	k [mm]	l [mm]	n [mm]
0 - 2000	500	1000		100 x 150	25 x 150	400	800	5	50	75	100
2001 - 5000	500	1000	600	100 x 150	25 x 150	400	800	5	50	75	100
>5000	500	1000	600	100 x 150	32 x 150	400	800	5	75	90	100

Cross braces for crates over 7 m and crates of more than 5000 kilos

150 mm for seaworthy crate and 300 mm for container crate

The horizontal side plates and end plates can be made with a width of 100 mm.

Photos



Photo shows:
A crate for break bulk transport.



Photo shows:
Method used for nailing corner joints when assembling the crate. Through the side board, there is a row of 3 nails for tacking the vertical end board and a row of 2 nails for tacking at the end of the horizontal end board.



Photo shows:
A container crate.
As is apparent, the distance between slots has been increased.

2.2.3 Light box

This type of packing can only be used for containers. It should mainly be used for packing of smaller parts and parts which can be secured to the bottom. Max. total weight 300 kilos, inclusive of tare weight.

Standard boxes can be used, with appertaining bottom plate, frames and cover (see table below) or specially adapted boxes can be fabricated, corresponding to the standard boxes.

Standard boxes

Inclusive of 4-way pallet with deck support, 6 mm plywood			
Type	Weight [kilos]	Length x width x height	Length x width x height
		External dimensions [mm]	Internal dimensions [mm]
EU6	32.4	1200 x 800 x 725	1185 x 785 x 570
EU8	35.5	1200 x 800 x 930	1185 x 785 x 775
EU12	41.7	1200 x 800 x 1300	1185 x 785 x 1180
EU6/2	16.3	800 x 600 x 725	785 x 585 x 570
EU8/2	18.4	800 x 600 x 930	785 x 585 x 775

Photos



2.2.4 Full steel frame

A full steel frame is taken to mean a frame where all equipment is kept within the frame. The full steel frame is an alternative to the crate. The steel frame can advantageously be used to transport heavy equipment or bulky equipment.

Method

1. Determine the weight, length, width and height of the equipment (weight indication is required in the packing list)
2. Determine whether the equipment is subjected to point loads or evenly distributed loads at the bottom of packaging.
3. Place the support for packaging at appropriate locations, and if necessary provide reinforcement of stress-loaded zones.
4. Determine whether the equipment is top-heavy (may be indicated by marking of the equipment or if the ratio between the height to point and gravity and width is more than 2:1. Tilting indicators must be fitted)

5. Make the frame, using the illustrations below as basis, in accordance with the assessments as per items 1-4.
6. Paint the frame according to programme 3 (see instruction manual No. 520530).
7. Protect exposed parts/surfaces/sharp edges. (dismantling to be done if necessary).
8. If necessary, wrap up the equipment.
9. Place the equipment in the frame and secure it.

Illustrations

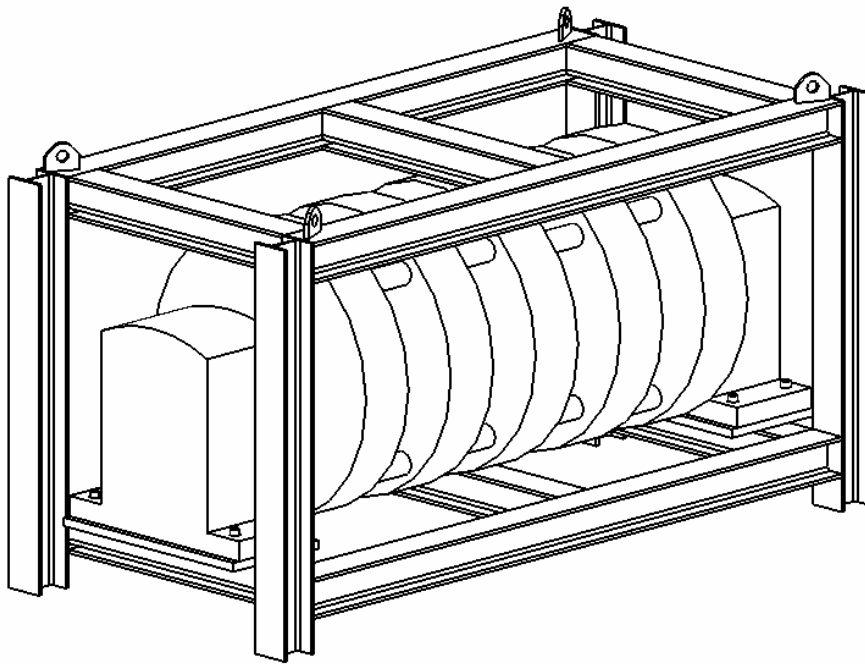
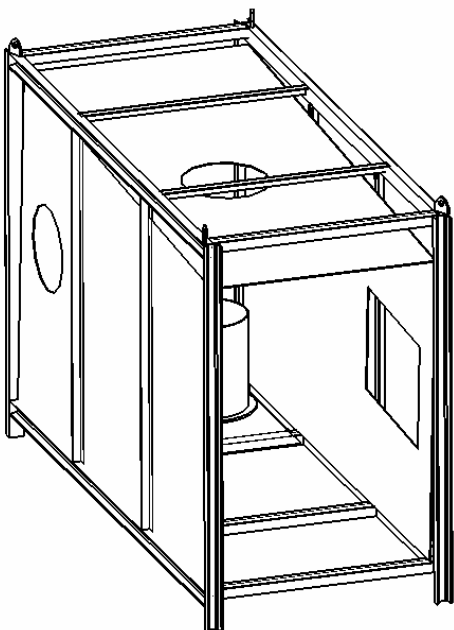


Illustration shows a heavy machine part in a full steel frame. If height is less than 1600 mm for container use and less than 2400 mm for maritime use, the frame must be made so that it can withstand the loads exerted by overlying parts, up to 1000 kg/m². This frame is made from HEB 100 sections, but the type and dimensions of sections depend on the dimensions and weight of the goods.



The illustrations show a light plate construction in a full steel frame. The entire bent-up plate construction is kept within the frame. Here, the outer and bottom frame are made from UNP 65 sections and the centre stiffenings are made of 40 x 40 angle irons. The two loose connectors are fixed to a plate at the bottom of the frame. If the height is less than 1600 mm for container use and less than 2400 for maritime use, the frame must be made so that it will be able to withstand loads exerted by overlying parts, up to 1000 kg/m².

This frame is an alternative to the crate.

Photos**2.2.5 Half steel frame****General notes**

A half steel frame is taken to mean a frame which supports the equipment, but where the equipment is not protected by the frame. The main purpose of the frame is to ensure handling capability and to permit loose parts to be assembled into larger units.

Method

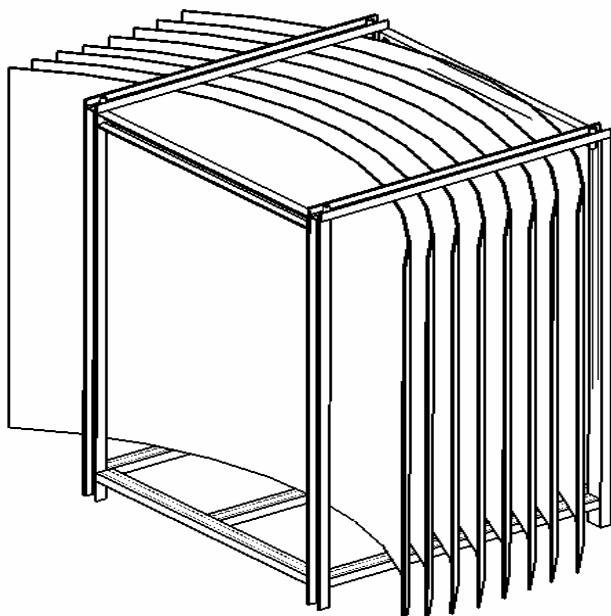
When assembling parts:

1. Assemble parts into compact units.
2. Assess the strength of the parts before they are assembled and packed.
(pack plate parts vertically if possible).
3. Determine the weight and dimensions of the parts, total length, width and height.
(Weights to be used in packing list).
4. Determine the position of the overall point of gravity, and assess need for support and fixation.
5. Make the frame and paint it according to programme 3 (see instruction manual No. 520530).
6. Paint the sling attachments yellow.

For individual parts:

1. Determine whether it will be possible to minimize the basic area and to optimize height.
2. Determine the position of point of gravity.
3. Make the frame and paint it according to programme 3 (see instruction manual No. 520530). 1A or similar to the surface treatment of goods.
4. Paint the sling attachments yellow.

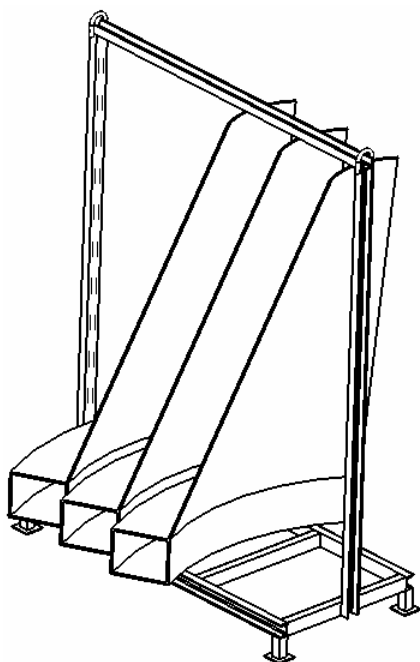
Illustrations and dimensions



The illustration shows collectively packed plate parts in a half steel frame fabricated from UNP 65 sections. This type of frame can be used if height exceeds 1600 mm and if thickness of goods is more than 6 mm for use in containers, and 2400 mm and 6 mm when used for break bulk transport.

The plates are collectively packed in vertical position to avoid deformation of the single plates. Boards are fixed to the sections in the bottom frame before the plate parts are placed in the frame and fixed using the overlying sections also equipped with fastened boards. These sections are fixed by means of bolted connections.

Lifting eyes can be welded to the frame or holes can be drilled in the sections, for lifting by crane.



Photos**2.2.6 Transport frame for bundle**

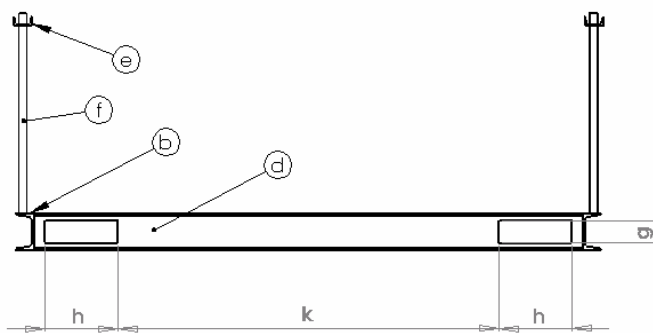
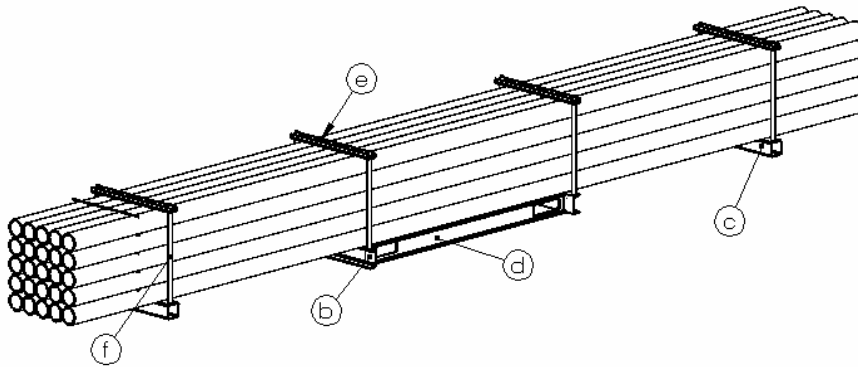
A transport frame is taken to mean a frame which is capable of maintaining the bundle as one unit, while simultaneously allowing handling capability by means of a truck and crane. It is very important to avoid deflections causing damage to the parts or permanent changes or preventing the parts from being lifted by means of a crane or forklift truck.

The designation one bundle only refers to sets of raw material for which there are no specific requirements with respect to surface characteristics.

Method

1. Determine the weight and dimensions of the bundle, weight, length, width, height, material thickness and type of section (weight indication to be used in packing list)
2. In the table select the correct material dimensions.
3. Make the frame in accordance with the illustrations below.
4. Paint the sling attachments yellow.
5. Place the bundle in the frame in manner ensuring equilibrium and fix the bundle to the frame.
6. After fastening, the nuts must be locked by means of conternuts or by welding to prevent them from working loose in transit.

Illustrations and dimensions



Length (a) is not indicated in the illustration; (a) is equal to the length of (d).

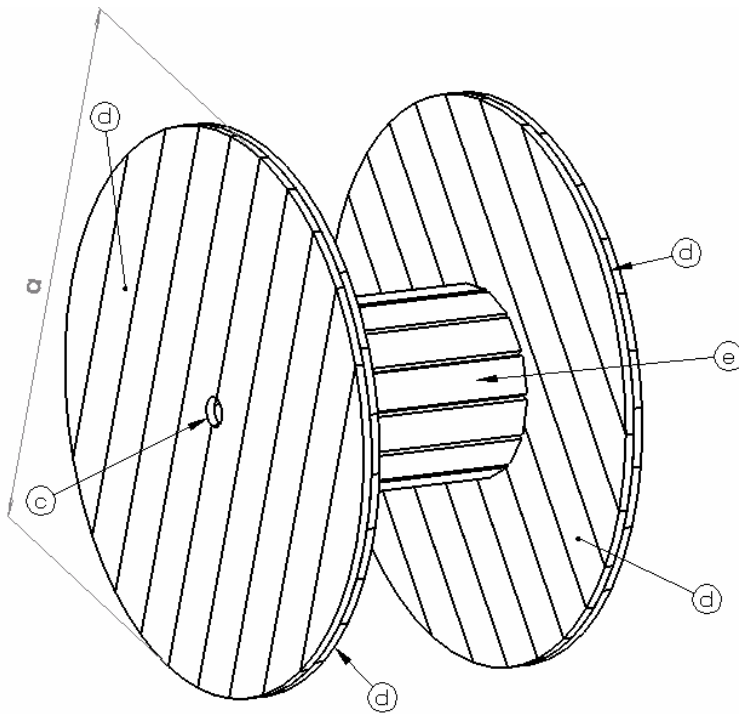
Length [m]	a [m]	b	C	d	e	f	g [mm]	h [mm]	k [mm]
3 - 7	2	UNP 100	100 x 100 x 4	IPE 100	UNP 65	M 20	60	200	1300
7 - 12	5	UNP 100	100 x 100 x 4	IPE 100	UNP 65	M 20	60	200	1300
>12	7	UNP 100	100 x 100 x 4	IPE 100	UNP 65	M 20	60	200	1300

2.2.7 Cable drum

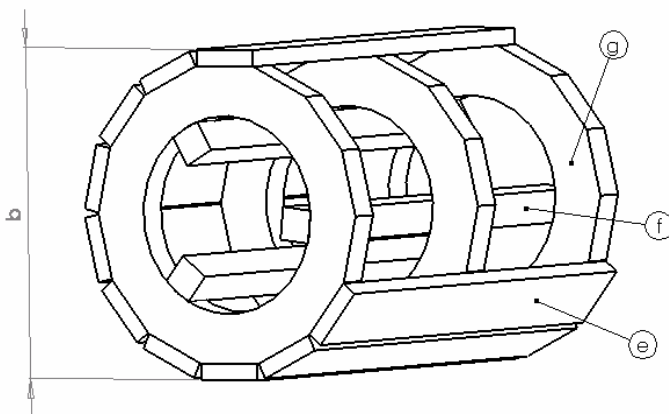
A cable drum is taken to mean a drum with coiled-up material, e.g. cables, wire, tapes etc..

For coil-up on drum, one unit must as a minimum have the capability to form 10 layers. Max. one unit per drum, ie one tape or a full-length cable.

Illustrations and dimensions



The sides are made up of two layers of boards placed at right angles to one another. In the innermost layer, the centre hole is adapted to the diameter (b) of the drum core.



The plates (g) can be made as 2-4 composite parts.

a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]
700	400	80	25 x 100	25 x 100	50 x 50	25
1000	500	80	25 x 100	25 x 100	50 x 50	25
1500	700	80	25 x 150	25 x 100	50 x 50	25
2000	800	80	25 x 150	25 x 100	50 x 50	25

Photos



The photo shows three sizes of cable drums. The protective boards are nailed to the sides.



Photo shows:
In centrehole there is a steel reinforcement ring.

Drum is assembled by means of nuts and large flat discs on 6 through-going threaded rods.

Fixation of equipment

2.2.8 Unpacked

A distinction is made between unpacked in container and unpacked for maritime transport since the container will provide some protection of the equipment and because of different methods for handling of goods.

Unpacked – maritime transport

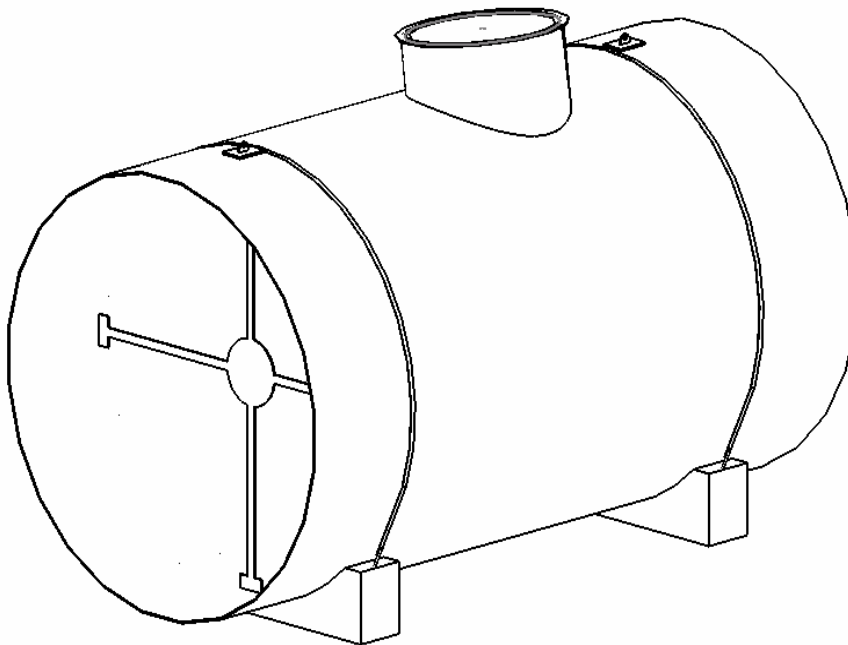
Considerations

Even if the table indicates that the goods can be sent unpacked, it will be necessary to determine whether this is appropriate, and whether packing of exposed areas could reduce the risk of damage in transit.

If possible, a support must be provided for unpacked equipment. This is done by using leg bolts on the flanges of equipment or by welding to the structure, cradles attached to the goods etc..

See illustrations below.

Illustrations

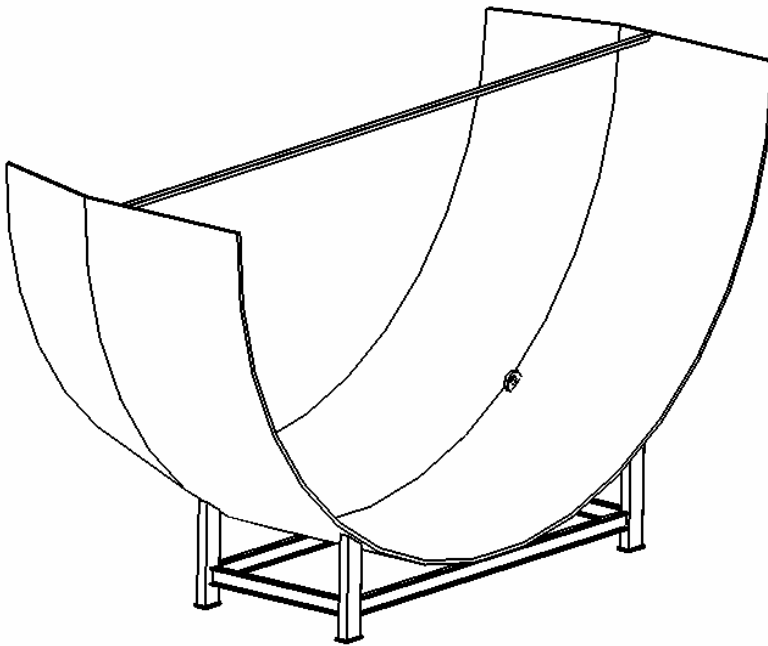


The illustration shows:

Tube section dia. 4000 x 10 x 7000 mm.

The tube is placed on two cradles, being fixed with flat steel retaining bands.

The tube is also equipped with 2 stiffening crosses. Painted as per Programme 1 (see instruction manual No. 520530).



The lifting eyes are mounted with reinforcement plates to avoid deformation of tube in connection with lifting operations.

The illustration shows one half of a tube section. The dimensions of the rolled plate section with a material thickness of 20 mm are: dia. 4000 x 1600 mm.

A base frame, in this case fixed to the plate section by welding, has been made to allow the plate section to be handled by truck; in this case, the legs are fabricated from 100 x 50 mm tube sections which are made up of transverse IPE 100 sections.

Under the transverse sections, there must be a clearance of minimum 100 mm. The plate section may require additional stiffening sections to maintain the desired shape.

Photos



2.2.9 Unpacked- container
Unpacked on bottom

This packaging may replace the crate for equipment having a height exceeding 1600 mm. It must be possible to fix the equipment to the bottom with bolts when using this type of packaging; otherwise crates must be used.

It must be possible to handle the bottom from 4 sides using a truck.

Photos



Photo shows:

Unpacked equipment on wooden bottom. It will be subject to point loads, and for this reason the centremost bearer is displaced to the left to ensure direct support function to withstand stress loads exerted by the equipment.

Fixation; see the detail on next photo.

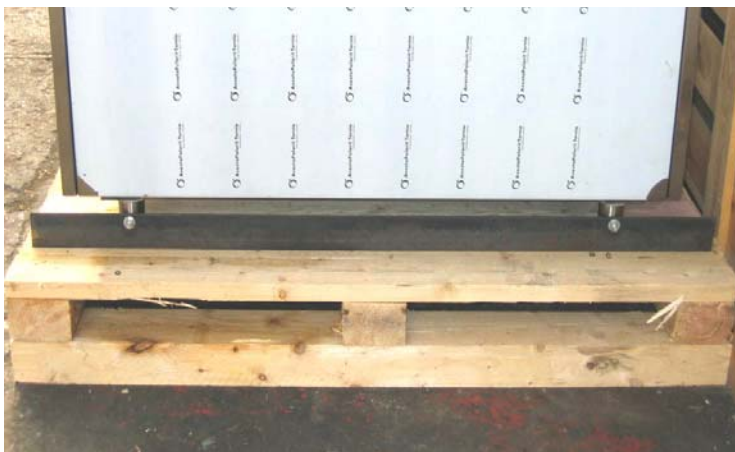


Photo shows:

Fixation viewed from the bottom. As can be seen, the bottom can be handled from the side as well as from the end.

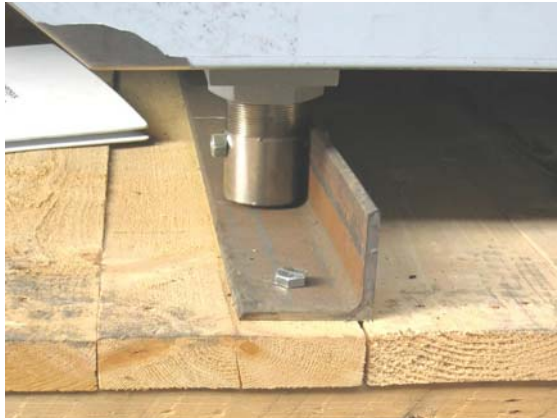


Photo shows:

Fixation of equipment to wooden bottom. Here angle iron piece is used. The angle iron is fixed to the bottom and the underlying bearers by means of bolts. The equipment is also bolted to the angle iron.



Photo shows:

Equipment unpacked on steel bottom.

The height of the equipment is more than 1600 mm.

In this case the frame is used as foundation for the equipment, but the same type of frame can be used as a transport frame for other equipment.

Use stretch hood film to protect the equipment.



Photo shows:

Electrical part weighing more than 300 kilos. The part is fixed to a double bottom frame on 150 x 150 mm bearers. The bearers are bolted together.

2.2.10 Barrels on pallets

General notes

Bulk material can be shipped in barrels. The most obvious examples are paint, oil and large quantities of bolts, nuts, small castings etc..

Photos



Positioning and fixation

It is essential to ensure that the barrels are placed on the pallet so that they are made to rest on the entire bottom edge. The barrels must be fixed to the pallet using steel strips and must subsequently be packed in stretch hood film.

2.3 Lining, packing and protection

2.3.1 Lining of closed box and light box

Lining

Lining is taken to mean cladding of the inner sides of the box. The function of the box lining is to protect against ingress of water.

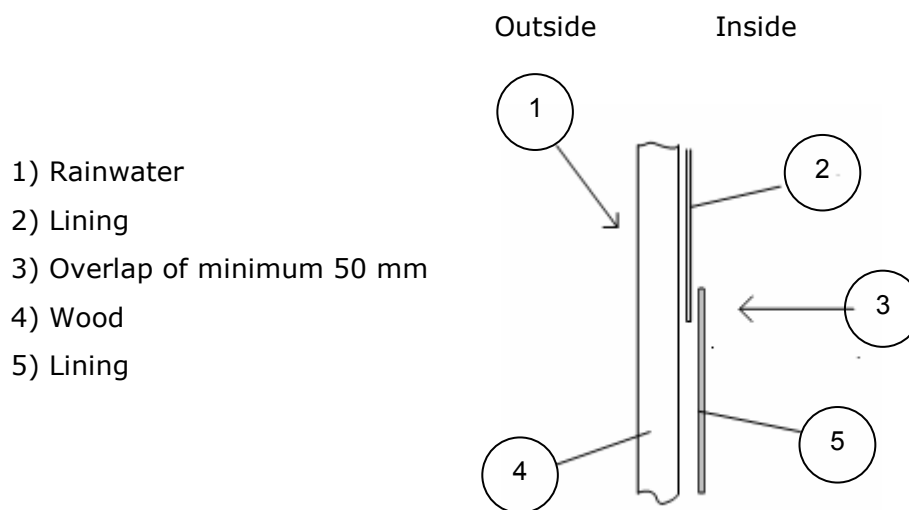
The following material must be used:

Plastic foil of polyethylene (LDPE) with a minimum thickness of 150 µm.

Method:

When fitting lining in a box, one full-length plastic piece should be used, to maximum practicable extent, for every side and for the cover. The plastic pieces must have an allowance/overlap circumferentially of about 100 mm which must be bent over the top edge to form an overlap at the corners of the box. The plastic piece for the cover must also have an allowance of about 100 mm at all edges which must be bent over the top edge of the sides. Plastic to be fixed using a staple machine.

If the dimensions of box necessitate use of more than one piece of plastic for each side, it is essential to ensure that the pieces overlap one another by minimum 50 mm. This overlap must also be ensured at the corners of the box; overlapping must be done so that water is prevented from entering the box at the joints. See sketch.



Plastic must be fitted internally to the cover of the box, using a water-proof plate to fix the plastic in order to prevent water accumulations between the cover and the plastic.

A lining must never be fitted at the bottom of the box.

2.3.2 Dense packing

A dense packing is taken to mean a water-proof packing in aluminium foil. For this packing it is very important to protect the edges and corners of the equipment to prevent damage to aluminium foil. This packing is primarily used for electrical parts and to protect parts not deemed suitable for rust-proofing by means of tectyl.

Protective layer

Various non-water absorbing materials can be used as protective layers.

For example: plates/corners of foam plastic, rubber mats, etc..

Method

If densely packed:

1. Protective layers must be fitted on the sharp edges and corners of the equipment in order to protect the aluminium foil against damage and perforation. Keep the equipment in original packing.
2. Place the equipment in the aluminium bag.
3. Fit sealing discs at the bolt holes if the equipment is bolted to the box.
4. Place desiccant bags around the equipment inside the bag (and inside the equipment if it is an air-tight unit). Consumption of desiccant, see Appendix 4.3.
5. The desiccant bags must not be in direct contact with non-painted surfaces.
6. Weld the foil, except for approx. 50 mm.
7. Suck some of the air out of the bag. Vacuum must not be allowed to form in the bag. For loose items placed in foam chips all air must be sucked out of the bag.
8. Weld the final 50 mm of the foil.

2.3.3 Valved packing

Valved packing is taking to mean that the equipment is covered by means of a plastic cap, i.e. with the equipment covered on top and sides by one piece of plastic to prevent hard-driven water/rain from penetrating the equipment. Do not use plastic pieces made up of tape or similar means. If the plastic cap is to be made of several plastic pieces, these pieces must be assembled by welding.

Dense packing is the preferred option for packing electrical parts mounted on a machine part. The entire machine part must then be regarded as being an electrical component and must be packed accordingly, unless the electrical parts are dismantled and separately packed or capable of being densely packed on the machine part. This must be approved by an FLSmidth inspector.

Material, see section 2.3.5.

Protective layer

The protective layer may consist of many different non-water absorbing materials.

For example: plates/corners of foam plastic, tape, rubber mats, etc..

Method

In connection with valved packing:

- Place the protective layer on the sharp edges and corners of the equipment so that the plastic foil is protected against damage and perforation.
- Cover the equipment with plastic foil which is closed at the sides and the top so that it will have the function of a cap.

2.3.4 Protection

Protection is taken to mean protection applied directly to the goods.

Protection of the equipment may be divided into two categories. Protection against corrosion and protection from impacts and shocks. Protection against impacts/shocks may be dispensed with if the selected type of packaging provides the required level of protection in this respect.

For electrical equipment, protection must always be provided in the form of 50 mm foam plastic as shock-absorbing material.

Material, see sub-section 2.3.5.

2.3.5 Materials for packaging and fillers

All wood used for the execution of packaging and appertaining stiffening elements must be of a quality corresponding to:

EN 12246-2000. Class P1

All must be treated in accordance with.

ISPM 15 (International Standards for Phytosanitary Measures)

Nails: Use cross-corrugation steel nails

Shock-absorbing and protective materials between large parts

For example, use plates or inserts made of polystyrene or extruded polyethene with closed cells.

Fillers and protective material

If fillers and protective material are used, this must, to maximum practicable extent, be an artificial product such as polystyrene, plastics, rubber, styrene plastic, foam plastic.

Water-absorbing materials such as wood shavings, straw, cardboard and paper must not be used.

ALUMINIUM FOIL to be used for dense packing

Aluminium foil must be in PP 007 bags (see data sheet in section 4.2) or similar material.

Desiccant

Bags containing the desiccant Bentonite must conform to DIN 55473 and the specifications in DIN-units.

3 desiccant units per square metre of aluminium foil must be used for the packing.

Example 10 m² foil: 10 m² x 3 units = 30 units

Disposal of packaging and fillers

Packaging and fillers must be disposable in accordance with international standards such as ISO.

2.4 Electrical equipment

2.4.1 General notes

For packing of electrical equipment for FLSmidth, a distinction is made between the following categories of packaging:

A – General cargo:

Seaworthy packing of equipment to be shipped by truck, railway, aircraft and ship and undergoing several transshipments while in transit.

Such packaging must be stackable. Also the packaging must protect the equipment against varying climatic conditions during the period from the time of shipment to the time of arrival at site (normally 12 months), unless otherwise agreed.

B – Container transport:

Container packaging for equipment to be shipped in containers.

Such packaging must be stackable and able to withstand shocks and impacts occurring while in transit. Also the packaging must be capable of protecting the equipment while it is stored in the container subject to varying climatic conditions during the period from the time of shipment to the time of arrival at site (normally 12 months), unless otherwise agreed

The packaging directions for, respectively, export packaging A (see section 2.4.2) and container packaging B (see section 2.4.6) indicate the types of external packaging recommended by FLSmidth for different equipment types:

The equipment is chosen on the basis of its strength characteristics during transit and storage.

The packaging directions indicate typical examples of equipment ordered by FLSmidth.

2.4.2 Packaging directions for export packaging A

Table for packaging directions A. General cargo

Equipment type	Examples of products	Outer packing/ inner cladding	Notes
Control and display panels with electronic components As well as Electronic equipment which is very sensitive to shock impacts, moisture and temperature fluctuations	Cabinets/swivel frames for central control systems, e.g. control cabinet for programmable control systems or interface cabinet for the ECS-system. Thyristor-control systems. Local panels e.g. for firing systems, dosing systems and analyzers for exhaust gases. Computers X-ray spectrometers Visual display units Printers	Closed box	Dense packing*
Small non-enclosed equipment with electronic components	Instruments for integration in panels. Loose printed circuit boards. PID-controller Measuring instruments for use in workshop or during installation.	Closed box	Dense packing *
Transducers, transmitters and measuring converters in enclosed configuration	Temperature transmitters Pressure transmitters	Closed box	Dense packing *
Low-current equipment which is less sensitive to moisture	Servomechanical equipment e.g. servomotors with potentiometer, motorized control valves. Indicators, e.g. positional indicators and pressurestats. Sensors, e.g. thermocouples, proximity switches, tubes and hoses for exhaust gas outlet Meters for installation at control point, e.g. oilflow meters and pressure gauges. Collecting boxes for analogue and digital signals, e.g. SA- and SD-boxes	Closed box	Valved packing **
Low-voltage equipment	Light installation equipment Start/Stop and emergency switches	Closed box	Valved packing **
Distribution material for indoor installation and appertaining parts	High-voltage groups Motor control groups Illuminating panels Controllable capacitor banks Relays for integration in panels and panel sections Contactor coils	Closed box	Dense packing*
Starters, motor regulators, capacitor banks and light transformers	Resistance starters Heating elements for electrostatic precipitators	Closed box	Valved packing **
Motors with degree of protection of IP44 or higher		Closed box	
Motors with degree of protection of less than IP44		Closed box	Valved packing **
Distribution and power transformers for outdoor installation		Crate	Valved packing

Rectifiers for electrostatic precipitators for outdoor installation	Pulse tanks Smoothing filters	Crate	Valved packing
Station equipment for outdoor installation	Isolating switches Oil circuit breakers Instrument transformers	Closed box	
Cable trays		Crate	
Master		Not packed	
Isolators for filters		Closed box	Protective layer, plate form along the sides of the box and between insulants

* Airtight foil bag with silica-gel

**Reinforced plastics in the cover of transport box

2.4.3 Means of transportation and dismantling of equipment

Transportation of large and/or bulky equipment necessitates dismantling of parts to allow for the limitations of the transport vehicle with regard to dimensions and weight. For example, radiators and expansion tanks on large transformers are dismantled. The top and base parts of central control panels are also dismantled.

Please consult our logistics unit in case of any questions concerning the limitations of the specific transport vehicles.

2.4.4 Packing of electrical equipment and lining of boxes

Electronic equipment which is very sensitive to shock impacts, moisture and temperature fluctuations

For shipment between suppliers (see section on local transport):

Use external packaging made of multi-layer corrugated cardboard and internal packaging made of non-hygroscopic, shock-absorbing material.

In connection with shipment for testing:

Place the equipment in the original packaging, closing it with tape and wrapping plastic aluminium foil around the corrugated cardboard. Place the packed equipment in a closed wooden box, made of tongued and grooved boards as specified in section 2.2.1.

Dense packing

Control and display panels with electronic components:

Place bags with desiccants in or at the equipment, and wrap plastic aluminium foil around the equipment. Use an impulse rod for weld-up of foil.

Compliance with the following points must be ensured:

1. Attach the desiccant bags inside the equipment/packing. Avoid any direct contact between bags and the electrotechnical components. Distribute the bags evenly within the area of packaging.
2. Execute continuous welded seams.
3. Packing must be done so that the foil is positioned as smoothly as possible.
4. Place sealing discs around the bolt holes if equipment is bolted to the box.

5. **Important:** Place the support on the sharp corners and edges of the equipment to protect the foil against damage and perforation.

Small non-enclosed equipment with electronic components:

Place bags containing desiccant in each single packing. The desiccant must not get into contact with the electrotechnical components.

Equipment supplied in original packaging:

Keep the original packaging around the equipment and wrap it up separately in welded plastic aluminium foil. Polysterene boxes are recommended for use as original boxes.

Equipment supplied unpacked:

First, wrap bubble foil around the equipment and subsequently use welded plastic aluminium foil.

Where appropriate, several parts can be packed together in a package of welded plastic aluminium foil after bubble foil has been wrapped around the individual parts.

Control and display panels containing less moisture-sensitive components

Pack the equipment as directed in section 2.4.2; Control and display panels.

Dismantle instruments and pack them as directed in section 2.4.2; small non-enclosed equipment.

Dismantle heavy components or equip them with transport fittings. This applies particularly to e.g. hinged swivel frames and transformers which may work loose in transit.

Fix loose cable ends to the inner frames of the panel.

Valved packing

Cover the equipment with plastic foil which is closed at the sides, acting as a cap. Place support at the sharp corners and edges of the equipment to protect the foil against damage and perforation.

Lining of closed boxes

For closed boxes where the equipment is not packed in welded aluminium foil as valved packing, see section 2.4.4.

2.4.5 Placing equipment in boxes

- Shaft ends on motors and other corroding surfaces must be rust-proofed prior to being packed.
- Protect exposed surfaces (e.g. lacquered surfaces or covers made of clear plastic) to avoid wear marks from the boards and bearers of the box. For example place adhesive tape on the contact faces of the equipment.
- Parts separately supplied must be carefully fixed. For example, fix foundation rails to the box by means of bolts.
- Secure motor bearings which may sustain damage in transit and during handling.
- Always insert plugs in screwed connections and cable lead-ins, and if possible place the equipment (e.g. silopilots) in the box so that any ingress of water is dispelled on the casing of equipment.

2.4.6 Packaging directions for container packaging B
Form for packaging directions B. Container transport

Equipment type	Examples of products	Outer packing/ inner cladding	Notes
Control and display panels with electronic components	Cabinets/swivel frames for central control systems, e.g. control cabinet for programmable control systems or interface cabinet for the ECS-system. Thyristor-control cabinets. Local panels e.g. for firing systems, dosing systems and analyzers for exhaust gases.	Crate	Dense packing*
Small non-enclosed equipment with electronic components	Instruments for integration in panels. Loose printed circuit boards. PID-controller Measuring instruments for use in workshop or during installation.	Light box	Dense packing * Light export box: Maximum net weight Approx. 80 kilos and no pallet bottom
Transducers, transmitters and measuring converters in enclosed configuration	Temperature transmitters Pressure transmitters	Light box	Dense packing *
Low-current equipment which is less sensitive to moisture	Servomechanical equipment e.g. servomotors with potentiometer, motorized control valves. Indicators, e.g. positional indicators and pressurestats. Sensors, e.g. thermocouples, proximity switches, tubes and hoses for exhaust gas outlet Meters for installation at control point, e.g. oilflow meters and pressure gauges. Collecting boxes for analogue and digital signals, e.g. SA- and SD-boxes	Light box	Valved packing **
Low-voltage equipment	Light installation equipment Start/Stop and emergency switches	Light box	
Low-voltage equipment which is sensitive to moisture	Relays for integration in panels and panel sections Contactor coils	Light box	Dense packing*

Motor control groups Illuminating panels Controllable capacitor banks		Crate	For container transport only if height of package is less than 2 m as specified in general requirements Dense packing
Starters, motor regulators, capacitor banks and light transformers	Resistance starters Heating elements for electrostatic precipitators	Crate	Valved Packing **
Motors		Crate Light box	Light export box; used for small motors weighing less than 50 kilos
Cable trays		Bundle	
Isolators for filters		Closed box	Protective layer, plate form along the sides of the box and between insulants

* Airtight foil bag with silica-gel

**Reinforced plastics in the cover of transport box

3 Stowing of container

3.1 Container transport – general notes

Goods to be stowed in containers must be packed as lightly and safely as possible since the container itself constitutes a seaworthy packing.

In terms of handling, it is foreseeable that it must be possible to move the goods, for example by means of a forklift truck.

See section 2.4.6 for suitable types of packing for stowing of container.

3.2 Container types

For container transport, the Shippers Own Containers (SOCs) are used, i.e. purchased containers since they are to be used for storage/as a store at site during a period of up to 1 year after arrival.

Consequently, the container must meet the following requirements:

- Visible CSC-plate with a validity of minimum 1 year
- No perforation due to rust or deformations
- Intact sealing strips at doors
- No dry rot in bottom boards
- The container must be wind- and water-proof

Containers must be delivered in accordance with ISO 668, i.e. standard 20' dc, 40' dc, 40' hc, 20' fr or 40' fr will be acceptable.

The internal dimensions for the most common containers are indicated in the table below:

NOTE that the dimensions may vary slightly from container to container

Internal dimensions 1	Length [mm]		Width [mm]		Height [mm]		Max total weight [kilos]*
	1	2	1	2	1	2	
20' container	5860	6060	233 0	244 0	238 0	259 0	20.000
Door opening			228 6		226 1		
40' container	1199 8	1219 0	233 0	244 0	238 0	259 0	27.000
Door opening			228 6		226 1		
40' container high cube	1199 8	1219 0	233 0	244 0	265 5	290 0	28.000

*payload must always be physically checked on the door of container.

3.3 Stowing

It is very important that the goods are stowed and shored up in the container, which means that the equipment must be fixed everywhere in the container by means of nails, screws, bolts, welding and lashing.

Any displacement, however small, of a unit will unleash significant forces which may have a destructive impact on packaging and equipment, and may, in worst-case scenario, cause the container to break loose in transit.

When wood is used to make braces or arresting mechanisms, such wood must be treated according to ISPM 15 (International Standards for Phytosanitary Measures).

3.4 Marking

The container must be marked with the lowest order number for parts stowed in the container, and from package number 10001 and upwards:

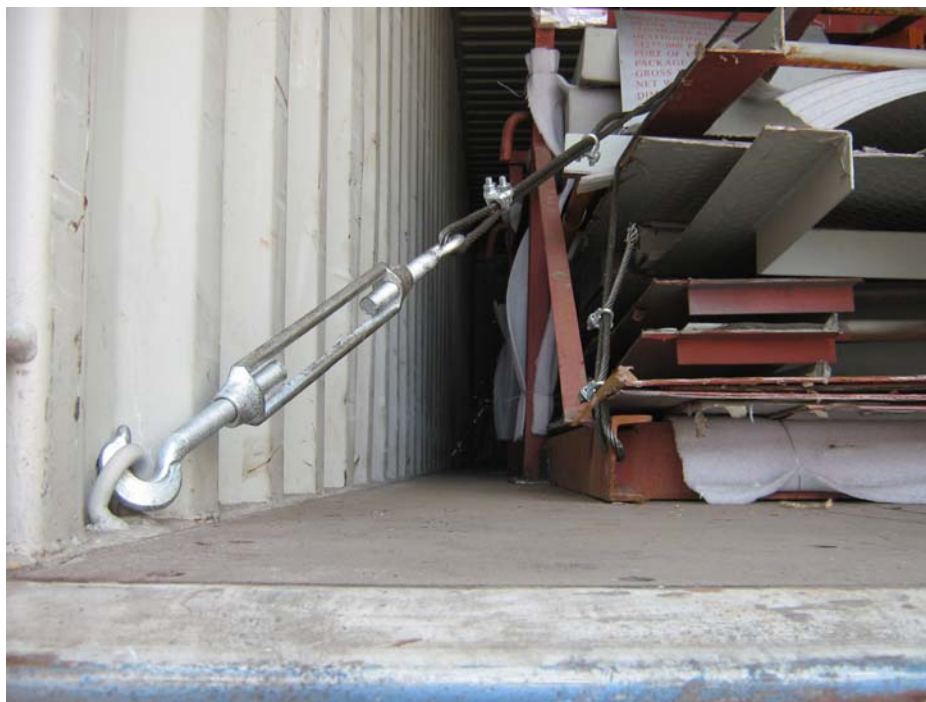
Example 1: 4-0645057-119110/**10001**

Example 2: 05-930145-01/**10001**

3.4.1 Placing of units

Optimum stowing of the container is achieved by:

- keeping the point of gravity as low as possible
- ensuring even load distribution on the bottom of container
- packing plate parts in vertical position – where feasible
- fixing the equipment to the bottom of the container
- fixing the equipment with fixed connections (bolts, welding, stop blocks)



4 Data sheets

4.1 "Open Box" Inspection

4.1.1 Procedures for Pre-Shipment Inspections

1. The Pre-shipment inspection will consist of the following:
 - a. Visual general inspection of the goods (not technical)
 - b. Inspection of quantities as per packing lists submitted by FLSmidth
 - c. Inspection of quality of the Packing
 - d. Inspection of quality of the Packing materials
 - e. Inspection of tagging of Goods to be shipped
 - f. Inspection of marking of Goods to be shipped

2. The following documents will be provided for the Pre-shipment inspection
 - a. RFI (Request for Information)
 - b. Advice of readiness
 - c. Packing List
 - d. E-mail with request for inspection incl. information as to whether the goods will be seaworthy packed or packed for subsequent containerization.

The Pre-shipment inspection must be carried out, by the Buyer or his appointed inspection company.

4.2 Aluminium foil

Technical Data Sheet

Protective Packaging

No. TDS03B

PP007

12 micron	Polyester Film
15 gsm	LDPE Bonding Layer
7 micron	Aluminium Foil
30 gsm	LDPE Bonding Layer
70 gsm	Black ribbed HDPE
Overall thickness 165 -175 microns +/- 5% tolerance	

TECHNICAL VALUES / PERFORMANCE

Nominal Substance	(gsm)	avg. 151.5 (146 -157)
Tensile MD	(kg150mm)	19.6-20.2
Tensile CD	(kg150mm)	21.5-24.7
Puncture Resistance	(N)	85-95
Tear MD	(N)	29-33
Tear CD	(N)	25-29.5
MVTR (Tropical)	(g/m ² /24Hr)	<0.05
Stiffness MD	(N/m)	58-63
Stiffness CD	(N/m)	75-84

Notes: MD = Machine Direction
CD = Cross Direction

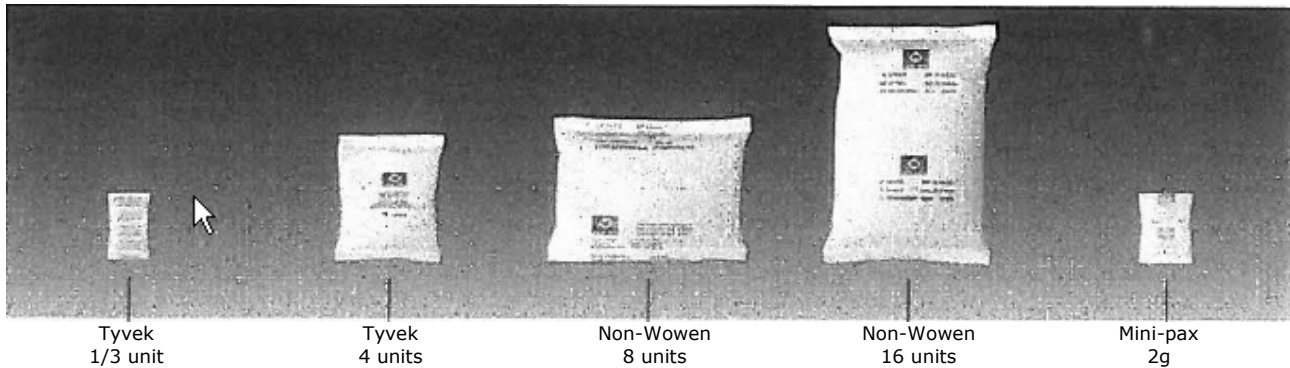
Tropical MVTR Conditions = 38°C, 90% Relative Humidity
Sealing Conditions 180°C, 10psi, 2 Second dwell time

CLASSIFICATION: DEF STAN 81/75 TYPE 1

This material is made from materials approved for food contact under the appropriate F & D Regulations.

The information is given in good faith but must not be regarded as forming a specification.

4.3 Desiccant



Tyvek	4 g	8 g	12,5 g	25 g	50 g	100 g	200 g	250 g	400 g	500 g	1000 g
Unit	1/6	1/3	1/2	1	2	4	8	10	16	20	32
Dimension (mm)	33 x 65	35 x 90	60 x 100	60 x 120	60 x 140	60 x 170	130 x 180	130 x 190	13 x 270	210 x 270	210 x 300
Number per box	2500	1000	1000	400	250	100	50	50	25	25	1
Non-Woven	6 g	12 g	18 g	35 g	70 g	130 g	260 g	540 g	1120 g		
Unit	1/6	1/3	1/2	1	2	4	8	16	32		
Dimension (mm)	33 x 63	33 x 89	65 x 80	63 x 115	62 x 135	80 x 147	120 x 193	110 x 250	187 x 295		
Number per box	2500	1000	1000	400	250	100	50	50	25		
Mini pax	1 g	2 g	3 g								
Dimension (mm)	19 x 36	22 x 44	25 x 44								
Number per box	1000	600	400								

Desiccants in Tyvek and Non-Woven qualities are available from 1/16 to 32 units. The unit is an international standard and indicates the moisture capacity - 1 unit having the capacity to absorb 5 grammes of moisture.

Three factors will determine the amount of desiccant to be used:

1. Tightness of packing (does air escape, allowing moisture to enter from the outside?)
2. The amount of excess air in the packaging surrounding the product (a full packaging contains smaller amount of air/moisture than a half-full packaging).
3. The composition of the product (does the product itself contain - and hence give off - moisture?)

2 types of desiccants:

In the bags two types of desiccant are used: Silica Gel and Bentonite, both of which absorb moisture in stable and uniform manner over a prolonged time period. When using Silica gel, which is a chemically manufactured product, it is known exactly how much moisture the desiccant is capable of absorbing and how much space it takes up.

Bentonite, which is a naturally occurring type of clay, has characteristics similar to those of Silica Gel. The absorption capacity is the same, but the volume may vary slightly according to the size of the clay grains. The advantage of Bentonite is that it is a low-cost product.

Contact Pack Tech to determine the correct amount of desiccant and to determine what type of desiccant and desiccant bag is most suitable for the specific packaging assignment.

4.4 Survey of symbols for handling and storage

A	This side up	F	Centre of gravity	L	Do not destroy barrier Sealed packing
B	Fragile, Handle with care	G	Sling / Strap here	M	Temperature limitations
C	Keep dry	H	Do not use sack truck here	N	Do not use forklift truck here
D	Keep away from heat (solar radiation)	J	Clamp here		
E	Use no hooks	K	Stacking limitation Weight		

A		F		L	
B		G		M	
C		H		N	
D		J			
E		K			

Further information is given in the standards EN ISO 780 and DIN 55 402