

## Content

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## 1. Scope

These work instructions apply

- as general guidelines for the design, type of packaging and labelling of packages and for the identification of component parts.
- for storage and project materials

## 2. Purpose

These work instructions regulate

- the type of packaging
- the design of packaging
- labelling of the packages

The specification in the work instructions should be taken into account where there is no other contractual arrangement with the client. The project-related packaging and labelling instructions should precede these.

The following tasks arise if, owing to contractual stipulations, packaging is to be carried out by Linde Kryotechnik AG or by a packaging company commissioned by Linde:

- identification of the component parts (Point 4.2)
- rust-proofing/protection from corrosion, conservation of the object, sealing openings, protection of machined surfaces
- punctual provision of the material to be packed
- the packer is responsible for preparing the packaging list (Point 4.10) commensurate with the effective content of each package
- loading onto the means of transport and securing the load, except for load securing which is the responsibility of the respective carrier.

## 3. Applicable Documents

- Labels
- Packaging lists
- Shipping note (material data sheet)

## 4. Sequence, Competency

### 4.1 Country of destination / transportation / climate / storage

#### 4.1.1 Transportation over land, by air and sea

The material must be packed taking into consideration its properties for this transport route, where the following must be heeded:

- the length of the transport route (possibly multiple handling of cargo);
- the different climatic conditions during transportation, different interim storage and storage on building sites;
- the vibration during transportation with cushioning elements in the packaging.

Insofar as nothing to the contrary has been prescribed, packaging must guarantee protection for an overall transportation and storage period of at least 12 months.

#### **4.1.2 Nitrogen Charge**

The objects (cold box and Skids) have to be charged with nitrogen. This charge resp. pressure has to be checked every 2 months until the start up.

If the pressure sinks under 0.1 bar it always must be recharged to the correct pressure. Should the pressure drop more than 2 times under 0.1 bar the pressure and leak test has to be redone during start up.

The location for charging as well as the location to read the pressures and the pressures for charging are marked on the transportation drawing.

#### **4.2 Marking of component parts**

All component parts must have permanent and weatherproof identification commensurate with the order or the technical terms of delivery attached to the order.

If direct identification is not possible on the component part, this should be affixed in a secure manner. In addition spare parts and tools must be identified by the words "Spare Parts" or "Tools".

In the event of spare parts for "2 years operation" these must be labelled as "2 years spares". The information must correspond to the information in the "Content" column of the packaging unit lists.

Alternative project-related instructions should be heeded.

#### **4.3 Rust-proofing, protection from corrosion, conservation, sealing of openings, protection of machined surfaces**

If there are no instructions in the customer order and/or technical terms of delivery, this may be based on experience; Logistics must, however, be informed immediately.

#### **4.4 Technical acceptance**

The instructions in the customer order and/or in the technical terms of delivery must be heeded.

#### **4.5 General packaging information**

##### **4.5.1 In general**

Packaging may only take place once the above Items 2-4 have been completed. The material must be packed taking its properties for despatch and the country of destination (e.g. climate) into consideration.

Packaging must always correspond to the state-of-the-art.

Applicable standards and guidelines as well as the regulations of transit countries and the recipient country must be heeded as minimum requirement.

Rough treatment during transportation requires strong and solid packaging construction. The packaging must protect the pieces of equipment from all kinds of damage (e.g. from moisture, rain, rust, corrosion, impact, rough treatment etc.) during transportation by truck, air freight, by sea with mixed transport taking into account multiple reloading with cranes, manual handling, pallet trucks, handcarts and mechanical carts and forklifts and interim storage and storage on the building site.

#### 4.5.2 Design

All boxes and crates etc. must be strapped using plastic tapes several times over. The plastic tapes must be wrapped right round the packaging unit.

Boxes, crates, partial packages, sleds, saddles or corresponding bottom runners, transverse and wooden supports etc. should be designed and adapted based on the weight and characteristics of the material.

Where pieces of equipment are transported on sleds, saddles etc. the ground clearance to the lower edge of the piece of equipment must be at least 10 cm.

Perfect conditions for attaching lifting ropes must be established. It must be ensured that the lifting ropes will not slip off.

In the case of varnished, primed or polished tanks, vessels or posts, the jacking positions must be protected using strips of suitable material so that the lifting ropes (usually steel ropes) cannot cause abrasion.

Basically all bottom runners must have tapered ends – except for boxes and crates. Bottom runners over 2 metres in length must be fitted with sliding runners (runner liners) if these are necessary to establish fixing positions for ropes taking the centre of gravity into consideration.

Heavy packaging units must be fastened with bolts on a strong timber beam sled and, if necessary, be surrounded by a strong timber beam frame. Packaging must be designed such that it does not unnecessarily add to the dimensions of the packaging unit.

If the dimensions of the packaged goods permit, the dimensions of packaging units for sea freight should be designed in a way that facilitates loading in containers.

The following internal dimensions of containers should be taken into consideration:

- 40" container      1200 x 230 x 240 cm
- 20" container      590 x 230 x 240 cm

All openings of vessels, transfer pipe, columns, machines, engines, exchangers etc. must be sealed. The respective instructions in our technical terms of delivery should be heeded.

The following applies to wood used to make packaging:

- Planks should be at least Grade III (or better), strength grade MS17 with mechanical sorting or S13 with visual sorting to DIN 4074, but free from rind and dull edges on all sides, without discolouration and insect damage;
- Planks as rails, boards, square timber and beams should be at least Grade II (or better) or strength grade MS17 with mechanical sorting or S13 with visual sorting to DIN 4074, but free from rind and dull edges on all sides, without discolouration and insect damage;
- wooden packaging in accordance with ISPM15, labelling on packaging or certificate to Linde.

Used wood and used packaging may not be used to manufacture packaging.

#### 4.5.3 Protection from corrosion

Sensitive parts liable to corrosion (e.g. switch cabinets, measuring equipment, electrical devices, valves, fittings, flanges, machines, welding electrodes, welding rods, spare parts etc.) must be shrink-wrapped in suitable film (PVC film may not be used). Shock-absorbing material should be used where necessary.

The fact that PE film (polyethylene film) becomes brittle at temperatures of -10° and below and loses its protective effect should be taken into account.

Care should furthermore be taken that the shrink-wrapped objects inside the film shell and the film shell are cushioned and fastened against the crates to avoid damaging the film e.g. through abrasion.

"Akylux" (or Correx) should be placed between the casing and frame of the crate lid. If the crate lid extends beyond the dimension of the Akylux sheets, so that several sheets are required, the sheets should be arranged in such a way that they overlap by at least 10 cm. In this case polyethylene film 0.2 mm thick should be placed over the entire lid area between the Akylux sheets and the lid casing. This prevents rainwater permeating the crate lid and pools of water collecting in the film shell in which the crate content is shrink-wrapped, which would result in breakage of the film.

#### **4.5.4 Securing the packed material**

The crate contents must be supported to prevent slipping and sliding during hefty impact when shunted, for example. Heavy parts, such as engines and generators, must be attached to the load-bearing bottom parts of crates (timber beams) with bolts.

Sufficient lashing possibilities must be provided for columns, tanks and vessels etc. during transportation by ship; these must be clearly marked on the pieces of equipment. Usually chains, ropes or turnbuckles made of rusting materials are used to brace goods on means of transport such as lorries, on trains and particularly on ships. If these are not allowed to come into direct contact with the goods we supply (rust, corrosion), respective protective measures must be taken and the Logistics Department at Linde must be informed.

Jacking positions on pieces of equipment made from rust-resistant materials must be protected from contact with materials that are not rustproof (e.g. ropes).

For example, this may be provided by attaching strips of material or underlay made from suitable non-slip materials (not wood) to the jacking positions.

#### **4.5.5 Packaging and loading orders to subcontractors**

- Packaging and loading takes place in agreement with Linde Kryotechnik AG

#### **4.5.6 Data logger**

- Linde Logistics decides which transports/components data logger should be used for.

#### **4.5.7 Containers**

If so-called "Shippers own Cntr." are used, these must comply with statutory regulations. These containers must carry a CSC safety approval plate which must be valid for at least a further 6 months from the time of registering readiness for shipment. The use of "Shippers own Cntr." is only permitted after prior consent by the Linde Logistics Department.

The loading of containers and securing of the load must be performed under consideration of the CTU-guidelines dated 17.02.1999.

The carrier(s) must be given the opportunity to inspect the inside of the container at the loading location or port of shipment.

In addition to the information specified under Point 4.6, the Logistics Department of Linde must be informed in good time, and at least when registering readiness for shipment, of special unusual features of delivery components, such as any associated risks and hazards, sensitivity to impact, sensitivity to corrosion etc.

#### **4.6 Information on dangerous goods**

If the deliveries involve

- explosive, gaseous, flammable, oxidising, poisonous, radioactive, acrid or otherwise hazardous substances,

these goods must be packed in accordance with valid regulations and laws. Only UN-inspected packaging units are permitted for dangerous goods. The outside of the package in packaging units must be identified with the requisite hazard symbols and inspection number/class of packaging.

The following regulations must be observed:

- Rail freight           RID/RSD
- Road freight         ADR/SDR
- Sea freight         IMO/IMDG-Code
- Air freight         IATA-DGR

The corresponding dangerous goods licences must be attached to the shipment.

Dangerous Goods may only be packed by an employee with a valid DB-Course.

This information must be transferred to the LKT registration of readiness for shipment.

#### **4.7 Labelling**

DIN 55402 Parts 1 + 2 apply to labelling, although with the stipulation that the pictogram may only be applied using stickers or signs if a painted application is not possible due to lack of a suitable surface.

See Point 4.6 for designations relating to dangerous goods.

In the case of cube-shaped packages the labelling must be applied to two adjacent sides; for cylindrical packages it must be applied to two sides, e.g. opposite sides.

Labelling of unpacked goods must be applied using permanent ink on metallic signs and should be affixed to 2 sides or both ends.

##### **4.7.1 Handling label**

Depending on their properties, packages must be labelled with the pictogram identifying handling in accordance with DIN 55402 Part 1 to ensure correct handling of the package.

The labelling must be consistent with the shipping documents.

#### **4.8 Spare parts / assembly tools and equipment**

Spare parts, which are usually delivered with the equipment, may be packed with the main components as long as no specific alternative instructions have been given in individual cases.

"2 years" spare parts must always be packed separately. Attention is drawn to the marking of component parts in Point 2.

Assembly tools or other devices that are used only temporarily on the building site and are then to be returned should be packed separately and registered as ready for shipment with a separate shipping note/packaging list.

#### **4.9 Parts with excess load dimensions and/or weight**

Parts that exceed the following dimensions and/or gross weight, including all protruding parts and including packaging,

Length	1360 cm
Width	244 cm
Height	265 cm
Gross	25 tonnes

should be regarded for sea freight and onward carriage to the country of destination as parts with excess load dimensions and/or weight. This also applies to parts that only exceed one of the above dimensions and/or weights.

If the scope of delivery contains parts that exceed the specified dimensions and/or weights, it is necessary to arrange transportation and packaging with Linde Logistics in good time.

Transportation sketches must contain the following information:

- Side view and cross-section of the piece of equipment;
- Outermost dimensions including supports and other protruding parts taking saddles and/or packaging into consideration;
- Net weight;
- Fixing positions for ropes for lifting and details of the rope angle or crane hook height (only specify if restrictions must be heeded in this respect); Alternatively, if more than 2 fixing positions are provided, the combination in which the fixing positions are to be used should be specified ;
- Fixing positions to which ropes may be affixed to secure parts on the means of transport (lorry, wagon etc.);
- Position of the centre of gravity in axial direction and position of the centre of gravity related to the cross-section of the piece of equipment (height dimension/side dimension);
- Resting points (places on which the part may be placed during transportation and storage) should only be specified if restrictions must be heeded in this respect. If resting points may only be used in specific combinations with each other, transport sketches must contain appropriate information.

The following should furthermore be specified if relevant:

- Information on an N2 filling to protect the interior from corrosion with details of filling pressure
- Other information that should be heeded during transportation and/or lifting

The sketches must be labelled in German or English.

#### **4.10 Packaging lists**

SAP packaging lists (Linde) or the supplier's packaging lists must be used for processing. The packaging lists are to be filled out according to actual circumstances.

A separate packaging list must be prepared for each packaging unit. This is extremely important because

- 1 copy in a waterproof envelope must be attached to the outside of each packaging unit and
- 1 copy must be put inside each package.

If no individual packaging lists are prepared, the collective packaging list must clearly show which item is packed in which package.

#### **4.11 Picture Documentation**

The goods need to be photographed in packed as well as in unpacked condition. The corresponding pictures have to be presented without specific request along with the receipt of the notification of readiness for dispatch.

#### **4.12 Registration of readiness for shipment**

To be sent to Linde, Logistics when ready for shipment (see Point 4.10).

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**5. Documentation, Quality Record**

The issuer archives each publication of the work instructions

**6. Distribution to Logistics**

Registration of readiness for shipment and all matters concerning logistics to:

Linde Kryotechnik AG

Gabriela Keller (Logistics & Procurement)

Jens Marzian (Head of Procurement & Logistics)

Tel.: +41 52 304 06 08

E-Mail: [gabriela.keller@linde-kryotechnik.ch](mailto:gabriela.keller@linde-kryotechnik.ch)

E-Mail: [jens.marzian@linde-kryotechnik.ch](mailto:jens.marzian@linde-kryotechnik.ch)